UNITED STATES OF AMERICA:
WAR DEPARTMENT.

MONTHLY WEATHER REVIEW.

(GENERAL WEATHER SERVICE OF THE UNITED STATES.)

JUNE, 1885.

PREPARED UNDER THE DIRECTION OF
BRIG. & BVT. MAJ. GEN'L W. B. HAZEN,
CHIEF SIGNAL OFFICER OF THE ARMY,

BY J. C. WALSHE,
2D LIEUTENANT, SIGNAL CORPS, U. S. ARMY.

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1885.

List of merchant marine steam and sailing vessels from which International Simultaneous Meteorological reports were received at the Office of the Chief Signal Officer, U. S. Army, Washington, D. C., in time to be used in the preparation of the Weather Review for the month of June, 1885.

Name of vessel.	Observers.
Allan Line.	
Br. s. s. Circassian	Capt. Wm. Richardson.
Grecian	C. E. Le Gallais.
Prussian	Alex. McDougall.
Scandinavian	John Park.
Siberian	R. P. Moore.
American Line.	
Br. s. s. British Princess	E. H. Froeth.
Am. Illinois	Geo. H. Dodge.
Indiana	R. W. Sargent.
Br. Lord Clive	P. Urquhart.
Anchor Line.	
Br. s. s. Anchoria	J. J. Small.
Australia	Alex. McRitchie.
City of Rome	R. D. Munro.
Columbia	R. T. Garvie.
Devonia	Hugh Young.
Elysia	James Brown.
Ethiopia	John Wilson.
Trinacria	Geo. Mitchell.
Anglo-Australian S. S. Co.	
Br. s. s. Port Phillip	Geo. Dulling.
Atlas Line.	
Br. s. s. Ailsa	Jno. W. Sansum.
Alvo	David Williams.
Span. Andes	A. de Amezaga.
Athos	Horatio Low.
Booth's S. S. Co. (limited).	
Br. s. s. Cyril	J. H. Johnson.
Bristol-City Line.	
Br. s. s. Brooklyn City	W. Fitt.
Llandaff City	T. H. Gore.
Canada Shipping Co.	
Br. s. s. Lake Nepigon	M. L. Tranmar.
Cunard Line.	
Br. s. s. Aurania	W. H. P. Hains.
Bothnia	T. Roberts.
Catalonia	Alex. McKay.
Cephalonia	Henry Walker.
Gallia	M. Murphy.
Pavonia	B. Woolfenden.
Scythia	P. Whealan.
Edward Carr's S. S. Line.	
Ger. s. s. Australia	G. Frank.
Europa	L. A. Kessal.
India	I. I. von Holdt.
Furness Line.	
Br. s. s. Stockholm City	K. Doyle.
General Trans-Atlantic Steamship Co.	
Fr. s. s. St. Laurent	M. de Jousselin.
Guion Line.	
Br. s. s. Wyoming	C. L. Rigby.
Wisconsin	Edward Bentley.
Hamburg-American Line.	
Ger. s. s. Bohemia	R. Karlowa.
Frisia	E. Kopff.
Gellert	W. Kühlewein.
Hammonia	H. F. Schwensen.
Lessing	B. Voss.
Moravia	O. Pezoldt.
Rhaetia	H. Vogelgesang.
Rugia	A. Albers.
Wieland	C. Hebich.
Westphalia	H. Barends.
Inman Line.	
Br. s. s. City of Berlin	Francis S. Land.
City of Chicago	Fred. Watkins.
City of Richmond	A. W. Lewis.
Johnson Line.	
Br. s. s. Nessmore	John Inch.
Lamport & Holt's Steamship Company.	
Br. s. s. Bicia	Fred. Graham.
Hevelius	John Carroll.
Belg. s. s. Hipparchus	Wm. Kelly.
Br. s. s. Dalton	J. Russell.
Donati	John P. Bovis.
Sirius	W. H. Stapledon.
Leyland Line.	
Br. s. s. Venetian	W. H. Trant.
Virginian	M. Fitt.
Liverpool, Brazil and River Plate Steam Navigation Company.	
Br. s. s. Olbers	James Clarke.
Mallory Line.	
Am. s. s. Alamo	Sam. Risk.
Lampasas	M. B Crowell.
San Marcos	A. C. Burrows.
Mediterranean and New York S. S. Co.	
It. s. s. Archimede	Domenico Viola.
Gottardo	G. Diliberto.
Indipendente	P. Pirandello.
Miss. & Dominion S. S. Co.	
Br. s. s. Ontario	W. P. Couch.
Toronto	Jas. McAuley.

Name of vessel.	Observers.
Morgan's La. & Texas R. R. & S. S. Co.	
Am. s. s. Chalmette	Capt. Robt. B. Quick.
National Line.	
Br. s. s. Canada	Wm. Pearce.
Denmark	W. Cochrane.
Greece	Thos. Foote.
Holland	Wm. Tyson.
Spain	W. A. Griffiths.
New York and Cuba Mail S. S. Co.	
Am. s. s. Cienfuegos	C. M. Faircloth.
N. Y., Havana & Mexican Mail S. S. Co.	
Am. s. s. City of Alexandria	J. W. Reynolds.
North German Lloyd Steamship Co.	
Ger. s. s. America	G. Meyer.
Donau	R. Ringk.
Elder	H. Helmers.
Elbe	F. Hamelmann.
Ems	W. Willigerod.
Fulda	O. Heimbruch.
Habsburg	Fr. Pfeiffer.
Hermann	H. Baur.
Hohenstaufen	H. Winter.
Hohenzollern	A. Meier.
Main	H. Christoffers.
Neckar	R. Busius.
Nürnberg	A. Jaeger.
Rhein	Th. Jüngst.
Salier	C. Wiegand.
Strassburg	H. Heincke.
Werra	J. Barre.
Weser	H. Bruns.
Ocean Steamship Company.	
Am. s. s. City of Augusta	K. S. Nickerson.
Oceanic Steamship Company.	
Am. s. s. Alameda	H. G. Morse.
Mariposa	H. M. Hayward.
Oregon Railway and Navigation Co.	
Am. s. s. City of Chester	Thomas Wallace.
Columbia	Fred. Bolles.
Oregon	E. Polemann.
Pacific Coast Steamship Company.	
Am. s. s. Geo. W. Elder	H. S. Ackley.
Orizaba	John N. Ingalls.
Santa Rosa	Chas. B. Johnson.
State of California	G. Debney.
Pacific Mail Steamship Company.	
Am. s. s. Acapulco	W. G. Shackford.
Br. Australia	R. C. Ghest.
Am. City of New York	Robt. R. Searle.
City of Para	L. Dexter.
City of Peking	G. G. Berry.
City of Rio Janeiro	Wm. B. Cobb.
City of Sydney	H. C. Dearborn.
City of Tokio	Com. Jefferson Maury.
Colima	Capt. W. B. Seabury.
Granada	M. Connolly.
San Blas	Thos. Chapman.
San José	A. D. Austin.
Quebec Steamship Company.	
Br. s. s. Muriel	G. S. Locke.
Orinoco	Jas. S. Garvin.
Red "D" Line.	
Am. s. s. Caracas	W. M. Hopkins.
Philadelphia	Sam. Hess.
Red Star Line.	
Belg. s. s. Belgenland	W. A. Beynon.
Nederland	Allen J. Griffin.
Pennland	Rud. Weyer.
Rhynland	J. C. Jamison.
Switzerland	H. Buschmann.
Waesland	J. Ueberweg.
Westernland	Com. W. G. Randle.
Rotterdam Line.	
Dtch. s. s. Edam	Capt. J. H. Taat.
Leerdam	P. Slierendregt.
P. Caland	T. H. Bonjer.
W. A. Scholten	G. J. Vis.
Zaandam	D' Hamecourt.
Royal Mail Steam Packet Company.	
Br. s. s. Gaudiana	C. W. Hanslip.
Minho	Walter Chapman.
Royal West Indian Mail Steamship Co., of Amsterdam.	
Dtch s. s. Oranje Nassau	J. A. J. Lacrooy.
State Line.	
Br. s. s. State of Georgia	G. Moodie.
State of Nebraska	A. G. Brass.
State of Nevada	John A. Stewart.
Thingvalla Line.	
Dan. s. s. Geiser	F. V. Schierbeck.
Island	W. Skjodt.
Thingvalla	S. T. H. Laub.
U. S. and Brazil Mail S. S. Co.	
Am. s. s. Finance	Ch. Off. James Lord.
Warren Line.	
Br. s. s. Iowa	Capt. Samuel Walters.

Name of vessel.	Observers.
White Cross Line.	
Dtch. s. s. De Ruyter	Capt. J. J. Brarens.
White Star Line.	
Br. s. s. Adriatic	H. Parsell.
Baltic	R. E. Bence.
Britannic	H. Perry.
Celtic	Benj. Glendell.
Germanic	C. W. Kennedy.
Republic	P. J. Irving.
Wilson Line.	
Br. s. s. Chicago	J. W. Jones.
Galileo	Richard Potter.
Lepanto	Wm. Abbott.
Marengo	J. H. Malet.
Otranto	F. Kerr.
Rosario	Lieut. Rogers, R. N. R.
Winsor Line.	
Am. s. s. Norman	Capt. H. W. Goggins.
Saxon	S. W. Snow.
Miscellaneous.	
Ger. s. s. Brutus	J. A. Voege.
Br. s. s. Camden	S. R. Chandler.
Castleford	C. Gray.
Edith Godden	John H. Bennett.
Effective	H. S. Mitchelson.
Halley	H. Hammond.
Kairos	Thos. Liddle.
Ivanhoe	John Cameron.
Lord Lansdowne	C. H. Backfill.
Phoenix	Benj. Davies.
Peconic	John Jenkin.
Portuense	Fredk. Hervs.
Ripon City	Ch. Off. Jas. Mansfield.
Romeo	Capt. W. Williams.
Span. Valencia	M. Santamarina.
Br. Vindolana	Thos. Harrison.
Warwick	P. F. Lobbett.
"New York Herald Weather Service."	
Am. s. s. Acapulco	W. G. Shackford.
Br. Adriatic	H. Parsell.
Ailsa	J. W. Sansom.
Albano	H. R. Hughes.
Alene	E. J. Seiders.
Alvo	D. Williams.
Aurania	W. H. P. Hains.
Baltic	Robt. E. Bence.
Belg. Belgenland	W. A. Beynon.
Br. Britannic	H. Perry.
Am. Chalmette	Robt. B. Quick.
City of Alexandria	J. W. Reynolds.
Br. City of Berlin	Francis S. Land.
City of Chicago	Fred. Watkins.
City of Chester	H. Condron.
City of Richmond	A. W. Lewis.
Am. Colon	Chas. C. Lima.
Crescent City	Jas. L. Lockwood.
Ger. Elder	H. Helmers.
Br. Elysia	James Brown.
Ger. Ems	Ch. Leist.
Br. Gallia	M. Murphy.
Dan. Geiser	F. V. Schierbeck.
Br. Ivanhoe	John Cameron.
Dtch. P. Caland	T. H. Bonjer.
Belg. Pennland	R. Weyer.
Br. Republic	P. J. Irving.
Belg. Rhynland	J. C. Jamison.
Am. San Marcos	Ch. Off. A. B. Connor.
Saratoga	Capt. John McIntosh.
Fr. St. Laurent	M. de Jousselin.
Belg. Switzerland	H. Buschmann.
Dtch. W. A. Scholten	G. Bakker.
Belg. Waesland	J. Ueberweg.
Westernland	Com. W. G. Randle.
Br. Wisconsin	Capt. Edw. Bentley.
Sailing vessels.	
Am. bg. Abbie Clifford	D. W. Storer.
sc. Abbie H. Gheen	W. W. Gheen.
Br. bg. Achsah	Alfred M. Shaw.
bk. Ada Peard	N. Hocken.
Ger. sp. Agra	A. Hegeman.
Anni	B. Fortman.
Am. bk. Antonia Sala	F. H. Mitchell.
Br. Corisande	Daniel Thoms.
Christina	S. E. Witter.
Ger. Diamant	L. Haesloop.
Br. Exile	Geo. J. Pearce.
Am. sc. Florence Rogers	J. S. F. McLeod.
Br. bk. Francesco Garguilo	John McDonald.
Am. sc. Georgia	E. G. Coffin.
George W. Lochner	J. C. Wiltbank.
Governor Hall	John Craig, jr.
Ger. sp. Ida	W. Schneider.
Am. bk. Idaho	W. S. Richardson.
sc. James H. Gordon	W. Lawrence.
Ger. bk. Leocadia	John Stohff.
Am. bg. L & W. Armstrong	A. Alexander.
Br. Lilian	H. F. Schive.
Am. sc. Luella A. Snow	Israel Snow.
bg. Mary Fink	Dan'l B. Darrah.
sc. Nelson Bartlett	Samuel Watts.
Sarah D. J. Rawson	Thos. D. French.
bkt. Spotless	Chas. E. Myrick.
sc. Stephen Bennett	William Douglas.
Ger. sp. Union	H. Fokken.
It. bk. Vincenzo Accame	N. V. Lavagna.
Br. sp. Winnifred	R. McDonald.

MONTHLY WEATHER REVIEW.

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INTRODUCTION.

This REVIEW contains a general summary of the meteorological conditions which prevailed over the United States and Canada during June, 1885, based upon the reports from the regular and voluntary observers of the Signal Service and from co-operating state weather services.

Descriptions of the storms which occurred over the north Atlantic ocean during the month are also given, and their approximate paths shown on chart i.

The month has not been marked by any abnormal features.

The number of atmospheric depressions traced on chart i. and described under "Areas of low barometer," is seven, the average number for June during the last twelve years being 8.8.

The mean temperature was below the average over a greater part of the country; in the lake region and Rocky mountain districts the means were from 2° to 4° below the normal, the departures in other districts being less marked. Along the New Engtand coast, in the Gulf States, and a part of the Rio Grande valley the mean temperature was slightly above the normal.

The precipitation was above the average in the plateau districts, over the eastern slope of the Rocky mountains, in the extreme northwest, lower lake region, south Atlantic states, and Florida; it was below the average in New England, the middle Atlantic and Gulf states, and in the central valleys.

Except during the prevalence of the storm traced as number 3, which caused many disasters in the vicinity of Newfoundland, the weather over the north Atlantic has been generally moderate.

Large masses of ice have been observed in the north Atlantic during the month, the area of the ice-region being larger than in the same month of preceding years.

In the preparation of this REVIEW the following data, received up to July 20th, 1885, have been used, viz.: the regular tri-daily weather-charts, containing data of simultaneous observations taken at one hundred and twenty-nine Signal Service stations and sixteen Canadian stations, as telegraphed to this office; one hundred and seventy monthly journals and one hundred and sixty monthly means from the former, and sixteen monthly means from the latter; two hundred and eighty-six monthly registers from voluntary observers; reports from 1,307 special tornado observers; forty-six monthly registers from United States Army post surgeons; marine records; international simultaneous observations; marine reports through the co-operation of the "New York Herald Weather Service;" abstracts of ships' logs, furnished by the publishers of "The New York Maritime Register;" monthly weather reports from the New England Meteorological Society, and from the local weather services of Alabama, Illinois, Indiana, Iowa, Nebraska, and Ohio, and of the Central Pacific Railway Company; trustworthy newspaper extracts, and special reports.

ATMOSPHERIC PRESSURE.

[*Expressed in inches and hundredths.*]

The distribution of mean atmospheric pressure over the United States and Canada for the month of June, 1885, determined from the tri-daily telegraphic observations, is shown by the isobarometric lines on chart ii.

The mean pressure for the month is greatest over the region to the east of the Mississippi river south of the fortieth parallel, and on the north Pacific coast, where the mean pressure ranged from 30.0 to 30.05.

Two areas of barometric minima are shown on the chart, one over the Gulf of Saint Lawrence, indicated by the isobar for 29.8, and the other over the central and southern Rocky mountain districts, where the barometric means are below 29.8, a small area in southern Arizona being inclosed by the isobar for 29.75.

As compared with the mean pressure for the preceding month an increase is shown on the Pacific coast and to the eastward of the one-hundredth meridian, except in New England and the Maritime Provinces. The increase along the Pacific coast is about .05, while over the greater part of the country to the eastward of the meridian above named it varies from .05 to .10. In the Rocky mountain districts, New England, and the Maritime Provinces the mean pressure is lower than for May, the deficiency being greatest in the last-named district, where it varies from .10 to .13.

The departures from the normal pressure are given in the table of miscellaneous meteorological data, and are also exhibited on chart iv. by lines connecting stations of equal departures. On the north Pacific coast and over a part of the middle plateau, the mean pressure does not differ from the normal; in New England and the Maritime Provinces it is slightly below the normal, and in all other parts of the country it is above the normal, the departures being greatest over an area extending from the south Atlantic coast to the extreme northwest.

BAROMETRIC RANGES.

The monthly barometric ranges were greatest in the extreme northwest, Fort Buford and Bismarck, Dakota, reporting 1.18; the monthly ranges were least in the Rio Grande valley and in southern California, San Luis Obispo, California, reporting 0.21, the lowest for the month.

AREAS OF HIGH BAROMETER.

I.—At 7 a. m. of the 2d the weather charts exhibited an area of comparatively high barometer, inclosed by the isobar for 30.0 (.10 above the normal), extending from the lake region to the Gulf coast. At the succeeding report the pressure in the east Gulf states had diminished slightly, but over the lake region and central Ohio valley it remained unchanged. During the next twenty-four hours this area passed to the eastward and extended along the Atlantic coast from South Carolina to Maine, over which region the pressure remained above the normal until the morning of the 4th. Light frosts occurred in the lower lake region and New England on the morning of the 3d, during the passage of this area, which, however, was not attended by a marked fall in temperature.

II.—On the morning of the 5th, when low area ii. was central to the south of the lower lake region, and low area iii. was developing in Utah, the pressure was below the normal in all districts, except on the Pacific coast and in the upper lake region. In the last-named district the pressure was but slightly above the normal, the region of greatest pressure being inclosed by the isobar for 29.9; this area passed to the southeastward during this and the succeeding day (the barometer rising slowly during its progress) and reached the middle Atlantic coast at midnight of the 6th, the pressure being from .10 to .14 above the normal at the coast stations. Generally clear weather attended the passage of this area, and the temperature fell from 10° to 20°, the minimum for the month occurring at the middle Atlantic coast stations on the morning of the 6th.

III.—The morning report of the 7th indicated the approach of this high area from the British Northwest Territory, the barometer having risen from .20 to .36 during the preceding eight hours at stations in that region. During the succeeding twenty-four hours the barometer continued to rise, and at 7 a. m. of the 8th the pressure was from .20 to .40 above the normal over Minnesota, Dakota, and Nebraska. At 3 p. m. of the 8th this high area had advanced slightly to the southward, the highest barometer, 30.37 (.37 above the normal), being reported from Saint Vincent, Minnesota, and the region of greatest pressure, inclosed by the isobar for 30.2, was almost wholly within the United States. From this date the area pursued an easterly course, reaching the lower lake region at midnight of the 9th and the Atlantic coast on the following morning. At 3 p. m. of the 10th the highest barometer (30.25, or .30 above the normal) was observed at Washington City, and the pressure was from .10 to .30 above the normal in all districts east of the Mississippi river, except along the Gulf coast and in the Canadian Maritime Provinces. The pressure continued above the normal on the Atlantic coast from the 10th to the 13th; the region of greatest pressure, however, extended gradually to the northeastward, and on the afternoon of the 11th, the highest barometer, 30.26, was reported from Yarmouth, Nova Scotia, this reading being .31 above the normal, and the pressure was from .20 to .30 above the normal along the coast from North Carolina to the Maritime Provinces. The pressure remained above the normal in Nova Scotia until the morning of the 14th, when this area disappeared to the eastward, while the pressure remained above the normal in the south Atlantic and east Gulf states. The lowest temperatures of the month in the districts from Dakota to the lower lake region and southward to the lower Missouri and Ohio valleys were associated with this high area, and during its prevalence in the extreme northwest freezing weather prevailed in that region. At Moorhead, Minnesota, the temperature fell to 30° on the morning of the 8th, this being the lowest temperature observed, and frosts occurred in all districts from the Missouri valley to New England, and as far southward as the central portions of Illinois, Indiana, Ohio, and Pennsylvania.

IV.—On the afternoon of the 14th this area was approaching from the region north of Montana, where the pressure was about .10 above the normal. During the next twenty-four hours it moved slowly southeastward, the pressure remaining unchanged, and was central on the afternoon of the 15th over the upper Missouri valley and northern slope, the barometer having risen from .30 to .40 at the centre. The high area continued its southeasterly movement and by morning of the 19th it extended over the lower lake region, Ohio valley, and Tennessee and along the Atlantic coast from Maine to the Carolinas, the pressure being from .20 to .29 above the normal in these districts. During the 19th the area moved slowly eastward and by midnight extended along the Atlantic coast from the Maritime Provinces to the south Atlantic states, where it remained nearly stationary during the next twenty-four hours; it disappeared to the eastward during the 21st.

V.—The afternoon report of the 20th showed an extensive high area covering the Pacific coast and Rocky mountain districts, the pressure being from .10 to .25 above the normal. At the succeeding report this area still overspread the districts above named, but the region of greatest pressure was shown to to the north of Montana, and at stations in Montana and Dakota, the barometric readings were from .24 to .37 above the normal. On the afternoon of the 21st the area was inclosed by the isobar for 30.3 and covered the northern portions of Minnesota and Dakota and a part of Manitoba, the pressure being .40 above the normal. This area moved slowly to the southeastward and did not reach the Atlantic coast until the 24th. The pressure continued above the normal on the middle and south Atlantic coasts from the 24th to the 27th, and this area did not entirely disappear from the Maritime Provinces until the close of the month. Frosts occurred in the extreme northwest, upper Mississippi and Missouri valleys on the 22d and in the lake region on the 22d and 23d.

VI.—This area was central over the north Pacific coast region on the morning of the 27th, the pressure at that time being above the normal in all parts of the United States, except in the extreme northwest and upper lake region. The morning report of the 28th showed the region of greatest pressure to be over Manitoba and the extreme northwest, the highest barometer, 30.3, being reported from Minnedosa and Saint Vincent; at this report the pressure was from .20 to .40 above the normal from Colorado and Kansas northward to British America. This area moved slightly to the southeastward during the 28th, and on the 29th and 30th remained nearly stationary over the upper lake region, upper Mississippi and Missouri valleys, where it was central at midnight of the 30th, with the barometer from .20 to .25 above the normal. Light frosts were reported in the upper lake region on the 29th.

AREAS OF LOW BAROMETER.

During the month seven areas of low barometer have been sufficiently defined to permit the approximate tracing of the paths of their centres. Number i. is a continuation of the storm described as low area vii. of the May REVIEW; numbers iii. and iv. developed in the middle plateau region; numbers ii. and v. were first located on the middle Rocky mountain slope; numbers vi. and vii. were first observed in the extreme northwest and upper lake region, respectively. None of these depressions pursued abnormal paths, but moved to the eastward or northeastward and disappeared beyond the range of the stations of observation.

The following table gives the latitude and longitude in which each area was first and last observed, and the average hourly velocity:

Areas of low barometer.	First observed.		Last observed.		Average velocity in miles per hour.
	Lat. N.	Long. W.	Lat. N.	Long W.	
	° ′	° ′	° ′	° ′	
No. I	48 00	73 00	45 00	61 30	17.7
II	40 00	102 00	40 30	74 00	28.6
III	41 00	112 00	48 00	58 30	34.4
IV	42 00	113 00	47 30	61 30	22.7
V	38 00	104 30	50 00	63 00	33.3
VI	47 00	96 00	49 00	62 30	29.5
VII	46 00	87 00	43 00	69 00	19.2
Mean hourly velocity					26.5

I.—At the midnight report of May 31st this depression, which has been described in the May REVIEW as number vii., was central in the Saint Lawrence valley to the north of Montreal, Quebec. At the succeeding report the centre of the disturbance had changed but slightly, it being apparently on about the same meridian, though a little south of its position at the midnight report. The barometer at Montreal read 29.51 (.42 below the normal), having fallen slightly since the preceding observation. In New England and the Maritime Provinces cloudy and rainy weather with brisk to high easterly winds prevailed, and clearing weather with light to fresh westerly winds prevailed in the lower lake region. At the afternoon report of the 1st the centre of disturbance was near Yar-

mouth, Nova Scotia, where the barometer had fallen .30 during the preceding twenty-four hours; by midnight it had moved slightly to the eastward and at that report was near Sidney, with the barometer at 29.47, .48 below the normal and .47 lower than at the observation of same hour on the preceding day. On the morning of the 2d the centre of disturbance had changed its position but slightly, and cloudy and rainy weather continued in New England and the Maritime Provinces. At Sidney, Nova Scotia, 1.72 inches of rain fell between midnight of the 1st and 7 a. m. of the 2d. This disturbance, moving very slowly eastward, continued central over Nova Scotia during the 2d, with the barometer rising slightly at the centre, and was last located at the midnight report of that date, its centre having remained in nearly the same position for twenty-four hours. A further description of this storm will be found under "North Atlantic Storms" as number 2.

II.—During the 1st, 2d, and 3d the barometer was below the normal over nearly all districts west of the Mississippi river. At the afternoon report of the last-named date the isobar for 29.7, indicating least pressure, inclosed eastern Colorado and the western portions of Kansas and Nebraska, the barometer being about .10 below the normal. At midnight of the 3d the depression was central near Des Moines, Iowa, where the barometer had fallen .20 during the preceding eight hours, the pressure being about .20 below the normal. The depression continued its easterly movement, and at 3 p. m. of the 4th was central near Chicago, Illinois, where the barometer had fallen .27 during the preceding twenty-four hours. Cloudy and threatening weather prevailed in the lake region and extreme northwest, and light rains fell in the last-named district during the eight hours preceding this report. At midnight the depression, having increased in energy, was central near Toledo, Ohio, the barometer at that station reading 29.6 (the lowest yet observed during the prevalence of the disturbance), .33 below the normal and a fall of .25 in the preceding twenty-four hours. At this report cloudy and rainy weather prevailed in the Ohio valley and New England, nearly three inches of rain having fallen at Indianapolis, Indiana, on the 4th. At 7 a. m. of the 5th the centre of disturbance was near Oswego, New York, the barometer at that station reading 29.5 (.41 below the normal), a fall of .36 in twenty-four hours. After this report the storm changed its course to the southeastward and was central over New Jersey during the afternoon, the barometer falling at the centre until reaching the coast line. The depression disappeared off the coast during the night of the 5–6th, the barometer having risen from .30 to .37 at the middle Atlantic coast stations during the eight hours ending at 11 p. m. of the 5th. Cautionary signals were displayed in advance of this storm at ports on the lakes and Atlantic coast, and were generally justified. This storm is further described as number 3 under "North Atlantic Storms."

III.—When the depression just described as number ii. was central in the lower lake region, a well-defined low area covered the central Rocky mountain region, the pressure being .20 lower at the centre than that observed at the centre of number ii. when the latter was first located in Kansas, Nebraska, and Colorado on the afternoon of the 3d. On the morning of the 5th the pressure was below the normal in all parts of the United States, except in California and the extreme northwest, where it was slightly above; at the centre of low area iii. it was .30 below the normal. At the succeeding report the depression was central in southeastern Wyoming, the barometer at Cheyenne having fallen to 29.24 (.54 below the normal), which is the lowest reading observed during the month of June at that station since its establishment, fourteen years ago. At this report (3 p. m.) the depression was in the form of an ellipse, extending from southern Montana to northern Colorado. At 11 p. m. the centre of disturbance had moved into southern Dakota, and at the morning report of the 6th it was shown near Bismarck, Dakota, where the barometer read 29.15 (.71 below the normal), a fall of .66 during the preceding twenty-four hours. The observer at Fort Bennett, Dakota, reports the following: "At 11 p. m. on the 5th the barometer read 29.16, which is the lowest observed at this station since its establishment, with one exception, viz.; May 18, 1883, when it read .01 lower." During the 6th the disturbance remained central in the extreme northwest, but changed its course to the eastward during the afternoon. The observer at Bismarck, Dakota, reports the following: "Very heavy rains fell during the 6th, the total precipitation aggregating 3.23 inches, which is the largest daily amount recorded at this station since its establishment. A northeasterly gale set in at 11.05 p. m., and continued until 8.25 a. m. on the 7th; the wind attained a maximum velocity of 56 miles per hour." At 11 p. m. on the 6th the centre of depression was near Moorhead, Minnesota; thence it moved rapidly eastward and, by morning of the 7th, was central over northern Lake Huron. At this report a trough of low barometer, inclosed by the isobar for 29.7, extended from the lake region and extreme northwest southwestward to the Mexican boundary, and the barometer was below the normal in all parts of the United States, except along the Atlantic and Pacific coasts. At 3 p. m. when the centre of depression was to the north of Lake Ontario near Rockliffe, where the barometer read 29.54, two secondary depressions were observed in the trough of the low barometer above referred to, one being central near Dubuque, Iowa, and the other in eastern Colorado. These secondary depressions were well-defined at the succeeding report (11 p. m.), but the barometer had risen .10, and, by morning of the 8th, when the centre of the principal disturbance was over the Gulf of Saint Lawrence, they had disappeared under the influence of an area of high barometer approaching from the northwest. This disturbance disappeared to the eastward of New Brunswick as a well-defined low area during the 9th. Cautionary signals were displayed in advance of this storm at the lake ports and on the Atlantic coast from Wilmington, North Carolina, northward, and were generally justified. In the Ohio valley and at certain stations in the lake region and upper Mississippi valley, the maximum temperatures for the month occurred during the prevalence of this low area.

IV.—This low area, shown on chart i. as first central in Utah at 11 p. m. of the 9th, probably approached from the north Pacific coast, where, during the preceding twenty-four hours the barometer was below the normal. At the midnight report of the 9th the barometer at Salt Lake City, Utah, read 29.51 (.25 below the normal), having fallen .17 during the preceding eight hours. This depression remained central in Utah, Colorado, and Nebraska from the 11 p. m. observation of the 9th until the morning of the 12th. At 3 p. m. of the 12th it was central in Dakota, and thence moved east-northeastward over the lake region and Saint Lawrence valley and disappeared over the Gulf of Saint Lawrence on the 15th; it is further described as number 5, under "North Atlantic Storms." During the passage of this depression over the lake region, the barometer was from .20 to .40 below the normal, and cloudy and rainy weather prevailed in all districts east of the Mississippi river, except on the south Atlantic coast. Signals were ordered for this storm at lake stations and on the Atlantic coast from Cape May, New Jersey, northward; they were generally justified. At Alpena, Michigan, Rochester and Oswego, New York, and the summit of Mount Washington, New Hampshire, the maximum temperature for the month occurred during the prevalence of this low area.

V.—The position of the centre of this depression became well-defined in Colorado, at the midnight report of the 13th; the barometer at West Las Animas at that time reading 29.56, or .20 below the normal. It remained central over the eastern slope during the two succeeding reports, and at 11 p. m. of the 14th was shown near Omaha, Nebraska, the barometer at that station reading 29.59, a fall of .24 in twenty-four hours. Cloudy and threatening weather prevailed in the lower Ohio valley and upper lake region, and rain fell in the extreme northwest, upper Mississippi, and Missouri valleys during the eight hours ending at 11 p. m. on the 14th, the rainfall for eight hours at Moorhead, Minnesota, amounting to 2.45 inches. The

morning report of the 15th showed the centre of disturbance over Lake Superior, the barometer at Duluth, Minnesota, reading 29.57, or .37 below the normal, and cloudy and rainy weather now prevailed in the upper Mississippi and Missouri valleys, the lake region, and Ohio valley. At the succeeding report the centre of disturbance had changed but slightly, remaining over Lake Superior, and the same weather conditions prevailed in the districts before named, except in the Missouri valley, where the weather had cleared. From 3 p. m. of the 15th to 7 a. m. of the 16th the centre of depression was transferred from Lake Superior to the Gulf of Saint Lawrence, where it remained nearly stationary until the afternoon of the 17th, when it disappeared in advance of a high area then approaching from the westward. Signals displayed for this storm were justified on Lakes Michigan and Erie, but on Lakes Huron and Ontario the winds did not reach a velocity to justify the display. Signals were also ordered on the Atlantic coast from Cape May northward, but, in most instances, they were not justified. The highest temperatures recorded during the month along the Atlantic coast north of Virginia, occurred on the 15th and 16th.

VI.—This disturbance was first observed as a well-defined low area of slight energy on the afternoon of the 20th, central near Moorhead, Minnesota, where the barometer at the 3 p. m. observation read 29.69, or .18 below the normal. Since the afternoon of the 18th the barometer had been slightly below the normal in the extreme northwest, while it was above the normal in all other districts and cloudy weather with light rains prevailed in the upper Mississippi and Missouri valleys on the 19th and 20th. At the 2 p. m. report of the 20th the depression extended to the southwestward and southeastward, and the chart for the midnight observation of the 20th showed a depression, inclosed by the isobar for 29.8, central in the Missouri valley, while the principal depression was moving slowly into the lake region, and at this report was central over Lake Superior. On the morning of the 21st the depression was central near Escanaba, Michigan, where the barometer read 29.70, or .24 below the normal. The subsidiary disturbance, before referred to, had reached central Illinois, having caused during its passage very heavy rains in the lower Missouri and central Mississippi valleys. During the succeeding sixteen hours both depressions united and at midnight the centre was shown near Rockliffe, Ontario, the barometer ranging from .20 to .30 below the normal from the lower Saint Lawrence, to the upper Ohio valley. Very heavy rains and high winds to gales occurred at the lower lake stations during the passage of the depression; the following rainfalls were reported at the 11 p. m. observation of the 21st: Sandusky, Ohio, 1.50 inches; Cleveland, Ohio, 2.12 inches; Erie, Pennsylvania, 2.98 inches; Buffalo, New York, 1.35 inches. On the morning of the 22d, the centre of depression was near Montreal, the barometer at that station reading 29.36 (.57 below the normal), or a fall of .54 in twenty-four hours, and during the preceding eight hours very heavy rains and high winds to gales had prevailed at stations on Lake Ontario. During the next sixteen hours the storm passed down the Saint Lawrence valley and at 11 p. m. was central over the Gulf of Saint Lawrence, with diminished energy, the barometer having risen .20 at the centre of the depression in sixteen hours. Signals were displayed in advance of this storm on the lakes and on the Atlantic coast from Wilmington, North Carolina, northward, and were justified, except at stations on the coast of Maine.

VII.—At the 11 p. m. report of the 27th this disturbance was central in northern Michigan, and cloudy weather with light rains prevailed from the extreme northwest to the Atlantic coast. On the morning of the 28th the centre of disturbance was near Saugeen, Ontario, the pressure remaining unchanged, and threatening and rainy weather continued in the lake region and on the Atlantic coast. The rainfall at Baltimore, Maryland, during the eight hours ending at 7 a. m. was 4.18 inches. The centre of this depression moved to the eastward during the next twenty-four hours and was central near Burlington, Vermont, on the morning of the 29th; its course then changed to the southeast, and the depression passed off the New England coast on the morning of the 30th. The closing reports of the month showed the disturbance to be slowly moving towards the Bay of Fundy with the pressure decreasing at the centre, and attended by high winds to moderate gales from east to southeast over the Maritime Provinces. Signals were ordered for this storm along the Atlantic coast from Cape May, New Jersey, to Portland, Maine, and were justified at all stations.

NORTH ATLANTIC STORMS DURING JUNE, 1885.

[*Pressure expressed in inches and in millimetres; wind-force by scale of* 0-10.]

The paths of the depressions that have appeared over the north Atlantic ocean during the month have been determined, approximately, from international simultaneous observations furnished by captains of ocean steamships and sailing vessels; abstracts of ship's logs and other data collected by the Signal Service agencies at the ports of New York, Boston, and Philadelphia; reports furnished through the co-operation of the "New York Herald Weather Service," ships' logs furnished by the proprietors of the "New York Maritime Register," and from other miscellaneous data received at this office up to July 21st, 1885.

Six depressions have appeared within the area covered by the observations; of this number, all but one (number 1) were apparently depressions which originated in, and traversed, the North American continent. The exception referred to was a depression which occupied the ocean near the fortieth parallel and between W. 35° and 55° during the 2d and 3d, after which date it probably merged in one of the above-mentioned depressions.

Only two of the depressions charted appear to have approached the European coast; the eastward movement of numbers 3 and 4 was checked by an extensive area of high barometer which occupied the ocean to the eastward of 30° W. on the 9th and which, spreading westward, caused the depressions to disappear on the 10th; number 6, after crossing northern Newfoundland, disappeared beyond the range of observation on the 25th. The general direction of movement of the depressions during June, 1885, was east-northeasterly. The most severe storm of the month was that traced as number 3; during the 6th and 7th the barometer fell to 29.0 (736.6), which is unusually low for storms of the summer months, and violent gales prevailed until the 9th; along the coast of Newfoundland this storm was especially disastrous. It is estimated that more than fifty vessels were totally wrecked on that coast, while a large number were driven ashore and seriously damaged; number 2 was also severe during the first three days of the month, having caused considerable damage to shipping and other property along the coast of Cape Breton island.

The weather over the north Atlantic during June, 1885, was, with the exception of the periods above referred to, generally moderate and fine; days of cloudy weather, with light to heavy rains, were frequently reported, but were generally followed by clear and pleasant weather.

During the first decade of the month the atmospheric pressure remained relatively low over the region between N. 40° and 50°, but at the beginning of the second decade an area of high pressures occupied this region and continued generally until the close of the month.

The following are descriptions of the depressions charted:

1.—When the centre of the depression described as i., under "Areas of low barometer" was over Cape Breton island, a decrease of pressure occurred near N. 40°, W. 50°, and the circulation of the winds indicated that another disturbance had developed. The pressure over the above-mentioned region ranged from 29.45 (748.0) to 29.6 (757.8), and strong breezes to moderate gales from w. and nw. occurred to the westward of the fifty-fifth meridian, while moderate s. and e. winds prevailed to the eastward of W. 50°. By the 3d this disturbance

had passed to about N. 41°, W. 38°, with pressure about the same as on the preceding day; between W. 42° and 35° and N. 40° and 45° the winds blew from ne. with the force of a fresh to strong breeze; to the westward of W. 45° they had shifted to southerly in advance of depression number 2, which had now left the coast. During the 4th this depression apparently united with the above, the combined systems causing rainy weather and moderate gales.

2.—This was a continuation of the disturbance described as low area i. under "Areas of low barometer." As it left the coast of Cape Breton island, where it had displayed considerable storm-energy, the pressure at the centre of depression was less than 29.5 (749.3); on the 3d the storm-centre was apparently near the southwestern edge of the Banks, with probably a slight rise in pressure, the marine observations to hand indicating pressures ranging from 29.6 (751.8) to 29.7 (754.4). Strong breezes to moderate gales from sw. to w. and nw. occurred during this date, but on the following day, when the storm-centre had reached about N. 43°, W. 43°, the winds increased somewhat in force and were reported as fresh to strong gales, and the pressure ranged from 29.35 (745.5) to 29.5 (749.3) over the region between W. 40° and 50°. The disturbance continued its easterly movement during the 5th and 6th, causing nw. and n. gales to the westward of the thirty-eighth meridian and strong e. and se. winds over the region between N. 45° and 50° and east of 35° W.; during those dates the barometer varied from 29.55 (750.6) to 29.7 (754.4). By the 7th the depression had moved northeastward and was central to the southwestward of Ireland, with pressure, as shown by the observations, about 29.68 (753.8) to 29.71 (754.6).

3.—This was a continuation of low area ii. described under "Areas of low barometer." It passed into the Atlantic from the New Jersey coast during the 5th, with decreasing pressure and increasing storm-energy, and, by the 6th, when the centre was to the southeastward of Nova Scotia, the barometer had fallen to 29.0 (736.6). It moved slowly north of east during the 6th, and on the 7th it was central near the eastern edge of the Banks, the pressure remaining about the same as on the preceding day. During those dates violent gales from ssw. to sw., w., and nw. occurred over the region from W. 60° to 35° and, from the great damage sustained by the fishing interests of Newfoundland, this storm is considered to have been the most disastrous that has visited the colony in forty years.

The following are some of the lowest barometer readings reported during the passage of this disturbance: on the 6th the ship "Union," H. Fokken, commanding, in about N. 41° 35′, W. 62° 31′, had very unsettled weather with variable and baffling winds, rain and fog; at 8 a. m. the wind shifted to ne., increasing rapidly until it blew a whole gale, with heavy rain for two hours; after 10 a. m. the wind decreased and the weather cleared; lowest barometer, 29.37 (746.0). The bark "Christina," S. E. Witter, commanding, in N. 38° 30′, W. 59° 40′, on the 6th, had a heavy gale from sw., veering to nw., with heavy cross sea, thunder, lightning, and heavy rain; lowest barometer, 29.31 (744.5). S. S. "Servia," W. McMickan, commanding, reported a gale from nw., lasting until 5 p. m.; the wind veered as far as ne. during the gale, and then backed to n., from which quarter it ended; the lowest barometer was 29.08 (738.6), at 9 a. m. on the 6th, in N. 41° 23′, W. 59° 30′; the greatest force of the wind was 8 (Beaufort scale).

The s. s. "British Queen," A. Smith, commanding, in N. 40° 44′, W. 53° 30′, had a whole gale from s. to sw., w., and nw.; lowest barometer, 29.26 (743.2), at 10 p. m. of the 6th. S. S. "Rugia," A. Albers, commanding, reported whole gale from ssw. to w. and nw.; lowest barometer, 28.95 (735.3), at 6 p. m. of the 6th. S. S. "America," G. Meyer, commanding, in N. 37° 20′, W. 52° 40′, had barometer 29.52 (749.8) (error unknown), at 7 p. m. of the 6th, with strong gale from sse. to sw. The s. s. "Geiser," F. V. Schjerbeck, commanding, reported: "June 6th, weather rainy with strong winds from s. by w. to wsw. and heavy sea, barometer falling; 11 p. m. wind s., force 7, heavy rain, wind and sea increasing; at 3 a. m. of the 7th, barometer 29.31 (744.5), wind s., blowing a gale; 6 a. m., in N. 42° 47′, W. 45° 37′, barometer 29.23 (742.4), wind s. by w., force 7–9; 7.30 a. m. (7th), barometer 29.22 (742.2), wind shifted, in a heavy rain squall which lasted four minutes, to wsw.; at 9 a. m. the barometer began to rise, and during the following twenty-four hours we had a gale from wsw." The s. s. "Nessmore," J. Inch, commanding, reported that at 10.30 p. m. of the 6th the wind increased to a heavy gale with high sea, barometer falling; at midnight it was blowing with unabated fury, the wind shifting from nw. to wsw. On the 7th, in N. 40° 57′, W. 50° 4′, the barometer (error unknown) read 28.84 (732.5), with w. gale of force 9.

On the 7th the s. s. "Amérique," P. Santelli, commanding, had a whole gale in N. 40° 30′, W. 53° 20′, wind veering from sw. to nw.; lowest barometer, 29.37 (746.0), at 8 a. m. The s. s. "British Empire," Captain Wills, had a nw. gale at 8 a. m. of the 7th, lasting until 4 p. m of the 9th, during which time the wind backed to sw. The greatest force was 8, at 1 a. m. of the 8th, from west, and the lowest barometer reading was 29.12 (739.6), at 2 a. m. of the 7th, in N. 41° 23′, W. 48° 20′. The s. s. "State of Pennsylvania," Captain Mann, had a w. gale from noon of the 6th until noon of the 10th. The greatest force was 10, from 1 a. m. to noon on the 9th; the lowest barometer, 28.92 (734.6), at 2 a. m. of the 7th, in N. 41° 40′, W. 48° 10′.

The s. s. "Edam," J. H. Taat, commanding, had a gale of force 10 from the 7th until the 9th; the lowest barometer was 29.10 (739.1), in N. 44° 40′, W. 44° 50′, at 1.30 p. m. on the 7th; the gale set in at ssw., and veered to sw. and w. The s. s. "City of Chicago," F. Watkins, commanding, had a whole gale, lasting from noon of the 7th until midnight of the 9th; the lowest barometer, 29.12 (739.6), was observed at 1 p. m. on the 7th, in N. 45° 30′, W. 39° 50′; the gale began at sse., and hauled to wsw. for one hour, then backed again to sw. by s. for 12 hours, until 2 a. m. of the 8th; it then hauled to wsw. and w., and at midnight it again backed to sw. by s., and s., and continued until midnight of the 9th, when it hauled to w., and began to moderate. The s. s. "Phœnix," B. Davies, commanding, had a fresh gale lasting from the 6th till the 10th; the lowest barometer was 29.56 (750.8), in N. 48° 33′, W. 33° 33′, at 9 p. m. of the 7th; the gale began at ese., and veered to se., s., and sw. to wsw. and wnw.

By the 8th the pressure had increased to about 29.6 (751.8), and the region of least pressures was shown near N. 48°, W. 38°, and on the 9th the readings remained about the same, but the lowest pressures were somewhat farther to the westward than on the preceding day; during these dates there was no abatement of the violent gales which had prevailed over the ocean between N. 40° and 50°, and W. 60° and 30°. An area of high barometer occupied the region east of W. 30° on the 9th, and this apparently barred the advance of the depression and probably forced it to the westward on the 9th and 10th, On the last-mentioned date the disturbance began to lose energy, and by the 11th it had disappeared from the chart, having apparently filled in.

4.—This was a continuation of low area iii.; it passed over the Gulf of Saint Lawrence during the 8th, with pressure near the centre about 29.2 (741.7). On the 9th it occupied southern Newfoundland, causing westerly gales over the ocean to the southward. During the day it moved eastward over the ocean and probably united with the preceding depression on the 10th, disappearing with that disturbance in the course of the twenty-four hours.

5.—This was a continuation of low area iv.; when crossing the Gulf of Saint Lawrence on the 15th it appeared to be losing energy, and on the 16th, when it occupied Newfoundland, its attendant winds did not exceed the force of a strong breeze. During the 17th and 18th it moved northeastward north of the fiftieth parallel; vessels on the southern edge of the disturbance reported barometer ranging from 29.7 (754.4) to 29.8 (756.9) with moderate to strong southwest winds. On the 19th it was apparently near the northwestern coast of Scotland.

6.—This was a continuation of low area vi. described under "Areas of low barometer." As it passed northeastward over the Gulf of Saint Lawrence and northern Newfoundland during the 23d and 24th it was attended by moderate s. to sw. and w. gales over the ocean between W. 55° and 65° and north of the fortieth parallel. On the 25th the disturbance passed northeastward beyond the range of the observations.

OCEAN ICE.

On chart i. are also shown the eastern and southern limits of the north Atlantic ice-region for June, 1885. These limits are determined from reports furnished by shipmasters, and from trustworthy data published in the "New York Maritime Register" and other newspapers.

During the month icebergs have been observed as far to the eastward as W. 41° 10′, and on various parallels of latitude between N. 42° and 50°; from about 42° 30′ N., 41° 30′ W. the edge of the ice-region trends in a southwesterly direction to about 39° 38′ N., 48° 12′ W. (the southernmost iceberg observed); from this point the line runs northwestward to the southern coast of Newfoundland, the westernmost bergs being observed in 47° N., 57° W. Many icebergs were reported off the northeastern coast of Newfoundland, but they were most numerous over the region between 41° and 44° N., and 47° and 50° W. The number of bergs observed in June, 1885, exceeded the quantities reported in the same month of previous years, excepting June of 1882, which month was also remarkable for the large number of icebergs observed.

As compared with the chart for the preceding month, (May, 1885) the limits of the ice region have changed as follows, viz: the eastern limit is about one degree to the westward of that for May, but the position of the southern edge indicates that the ice has drifted steadily southward, the limit being more than one degree farther south than that of the preceding month.

The following table shows the comparison between June 1885, and the same month of the three preceding years:

Southern limit.			Eastern limit.		
Date.	Lat. N.	Lon. W.	Date.	Lat. N.	Lon. W.
	° ′	° ′		° ′	° ′
June, 1882	40 18	48 50	June, 1882	44 26	42 50
	39 34	38 46?	June, 1883	48 14	42 23
June, 1883	40 28	51 45	June, 1884	44 00	45 23
June, 1884	40 42	47 49	June, 1885	45 14	41 12
June, 1885	39 38	48 12		42 30	41 20
				44 51	41 35

Icebergs were reported during June, 1885, as follows:

1st.—S. S. "Assyrian Monarch," between N. 43° 20′, W. 47° 38′, and N. 43° 00′, W. 49° 20′, passed several large icebergs; s. s. "Leerdam," in N. 48° 1′, W. 45° 0′; at 6.30 p. m. passed an iceberg about one hundred feet high and a quarter of a mile long, bearing n., about two miles distant; also passed several medium-sized bergs between 9 and 12 p. m. The s. s. "Wetherby," in N. 41° 24′, W. 46° 38′, passed an iceberg; at 8.30 a. m., in N. 41° 25′, W. 50° 27′, passed another; s. s. "Main," in N. 41° 12′, W. 47° 39′, passed a small iceberg; s. s. "Elysia," in N. 41° 22′, W. 48° 42′, passed two icebergs; one low and very dangerous, and the other much larger.

2d.—S. S. "Siberian," in N. 47° 20′, W. 49° 20′, passed a large iceberg, also passed two small bergs in N. 47° 40′, W. 49° 00′; s. s. "Aurania," in N. 40° 48′, W. 48° 20′, at 9 a. m., sighted five icebergs on the starboard quarter, about three miles distant; temperature of air, 68°; water, 64°; s. s. "City of Chester," in N. 41° 54′, W. 51° 4′ to W. 51° 30′, passed two icebergs, one about one hundred feet long and fifty feet high, and the other much larger; temperature of water, 43°; s. s. "Leerdam," in N. 47° 15′, W. 46° 32′, at 4.30 a. m., passed two large icebergs about three miles to the northward; one was two hundred feet high and about five hundred feet long, the other about one hundred and fifty feet high and five hundred feet long; also passed several medium-sized bergs; in N. 46° 42′, W. 48° 27′, at 2 p. m. passed several large pieces of ice; s. s. "Cephalonia," between N. 41° 20′, W. 48° 2′, and N. 41° 43′ W. 47° 23′, passed seven icebergs and some small pieces; s. s. "Catalonia," in N. 40° 40′, W. 48° 6′, at 6 a. m., passed a large iceberg; s. s. "Wieland," in N. 41° 41′, W. 48° 50′, passed a small iceberg; s. s. "Fulda," in N. 43° 49′, W. 42° 53′, passed an iceberg about one hundred feet high; in N. 43° 48′, W. 42° 59′, passed an icefield and several small pieces, temperature of water, 62°.6; bark "Egeria," from N. 43° 00′, W. 47° 00′, to N. 41° 00′, W. 50° 00′, passed a large number of icebergs, some of which were estimated to be three hundred and fifty feet high.

3d.—S. S. "Siberian," in N. 47° 40′, W. 48° 56′, passed two small icebergs; s. s. "Germanic," between N. 41° 20′, W. 48° 2′ and N. 41° 13′, W. 49° 50′, passed six icebergs; s. s. "Fulda," in N. 42° 38′, 49° 16′, passed floating ice, and between N. 42° 38′, W. 50° 38′ and N. 42° 38′, W. 51° 32′, passed three large icebergs, the largest being about three hundred feet high; s. s. "Liscard," in N. 44° 51′, W. 41° 35′, at 9 a. m., passed several icebergs; s. s. "Britannic," between N. 42° 25′, W. 51° 27′ and N. 42° 43′, W. 49° 40′, from 1 p. m. till 7.40 p. m., passed twenty-five icebergs of various sizes; at 9.25 p. m. passed a berg in N. 42° 53′, W. 48° 6′.

4th.—Bark "Stormy Petrel," in N. 44° 0′, W. 45° to 50°, passed about one hundred icebergs; s. s. "Siberian," in N. 48° 56′, W. 45° 21′, passed a very large iceberg; s. s. "Ethiopia," from N. 42° 50′, W. 48° 30′ to N. 42° 20′, W. 51° 20′, passed seventeen large icebergs and several small icebergs; s. s. "British Crown," in N. 41° 11′, W. 47° 22′, passed a large iceberg, also, in N. 41° 3′, W. 47° 44′, passed another; s. s. "Manitoban," in N. 44° 50′, W. 46° 12′, passed several icebergs; s. s. "Liscard," in N. 44° 53′, W. 46° 46′, at 10 a. m., passed innumerable icebergs; s. s. "Britannic," in N. 43° 2′, W. 47° 52′, at 1.50 a. m., passed an iceberg; s. s. "Venetian," in N. 43° 44′, W. 48° 49′, at 10.50 a. m., passed an iceberg about one hundred and fifty feet high, also, at 0.5 p. m., in N. 43° 41′, W. 49° 8′, passed another, twenty feet high; at 1 p. m., passed a group of four bergs of various heights and several small pieces.

5th—S. S. "Servia," between N. 41° 43′, W. 48° 32′ and N. 41° 32′, W. 52° 0′, saw numerous icebergs; s. s. "British Queen," in N. 41° 0′, W. 47° 10′ to 47° 43′, from 4 to 7 p. m. passed several icebergs; bark "H. J. Hammond," in N. 42° 0′, W. 49° 21′, passed four icebergs; the s. s. "Lord Lansdowne," in N. 41° 11′, W. 47° 15′, at 7.50 a. m., passed an iceberg about seven hundred feet long and in peaks of about eighty feet high; at 10.45 a. m. passed to leeward of another berg about one hundred and thirty feet high and one thousand feet long, square and very massive; temperature, while passing one mile to windward of first berg, air 54°, water 59°; when passing one mile to leeward of the second berg, air 50°, water 50.° Captain Baskfill reports: "At noon, having sailed twelve miles to the westward, found air 51°, water 49°, with no ice in sight; therefore the temperature is not a very good guide."

6th.—S. S. "Nessmore," between N. 41° 40′, W. 47° 50′ and N. 41° 29′, W. 48° 30′, passed four large icebergs; ship "Ida," in N. 41° 43′, W. 47° 15′, passed an iceberg about one hundred and fifty feet high; s. s. "Rugia," between N. 41° 56′, W. 51° 12′ and W. 51° 22′, passed six icebergs mostly from one hundred to two hundred feet high; lowest temperature of water, 44°; s. s. "Amérique," in N. 41° 2′, W. 48° 40′, at 8 a. m., passed an iceberg about one hundred and fifty feet high and two hundred and seventy feet long; s. s. "Sidonian," in N. 41° 20′, W. 47° 20′, passed an iceberg about fifteen feet high and three hundred and fifty feet long; also passed another in N. 41° 15′, W. 48° 24′; bark "H. J. Hammond," in N. 42° 37′, W. 51° 0′ passed eight icebergs, four of which were very large; s. s. "City of Rome," in N. 40° 50′, W. 50° 30′, at 5 a. m. passed an iceberg; in 41° 00′, W. 49° 50′, at 7 a. m. passed another; in N. 41° 21′, W. 48° 40′, at 11 a. m., passed six bergs.

7th.—S. S. "State of Pennsylvania," between N. 41° 40′, W. 48° 21′, and N. 41° 33′, W. 49° 10′, passed ten icebergs; bark "Lynwood," in N. 44° 30′, W. 46° 30′, passed a large iceberg; ship "Theo. H. Rand," in N. 48° 30′, W. 49° 10′, passed a large iceberg; s. s. "Elbe," in N. 40° 50′, W. 47° 45′, at 4.15 p. m. passed a large iceberg, and at 6 p. m. in N. 41° 6′, W. 47° 8′, passed a medium-sized berg.

8th.—S. S. "Geiser," 10 a. m. in N. 42° 0′, W. 48° 18′, passed an iceberg; in N. 41° 42′, W. 48° 54′, passed three bergs at 3 p. m.; temperature of water falling gradually from 61°.7 to 54°.5 and later to 41°; s. s. "Sidonian," in N. 41° 14′, W. 49° 45′, passed an iceberg one hundred feet high and three hundred feet long; s. s. "Juliet," in N. 41° 16′, W. 48° 39′, passed a number of large and small icebergs.

9th.—S. S. "City of Chicago," in N. 41° 52′, W. 47° 25′, passed two large icebergs; s. s. "Gothenburg City," between N. 47° 16′, W. 51° 35′ and N. 47° 1′, W. 52° 25′, from 7 a. m. to noon passed eleven large and small icebergs; s. s. "Edam," between N. 43° 45′, W. 48° 0′ and N. 42° 50′, W. 50° 40′, passed several icebergs during the 9th and 10th; bark "Carniola," in N. 41°, W. 49°, passed several icebergs; s. s. "Celtic," in N. 41° 42′, W. 50° 56′, passed a large iceberg; s. s. "Pavonia," in N. 41° 23′, W. 49° 36′, passed a large iceberg, also in N. 41° 26′, W. 48° 32′, passed another.

10th.—S. S. "Ems," in N. 41° 10′, W. 48° 11′ to W. 48° 57′, from 11.20 a. m. to 1.30 p. m., passed several small icebergs; s. s. "Adriatic," between N. 44° 58′, W. 45° 59′, and N. 44° 29′, W. 48° 4′, passed several icebergs; s. s. "Canada," in N. 41° 14′, W. 48° 36′, passed two small icebergs and some small ice; s. s. "Monarch," in N. 42° 15′, W. 47° 47′, from 3 a. m. to 8 p. m., passed ten icebergs and several small pieces; s. s. "Celtic," in N. 43° 6′, W. 46° 57′, passed a small iceberg.

11th.—S. S. "Furnessia," in N. 43° 29′, W. 46° 36′, passed three icebergs; s. s. "Illinois," in N. 39° 38′, W. 48° 12′, passed the remains of an iceberg awash; s. s. "Phœnix," in N. 42° 40′, W. 47° to 51°, passed forty-eight icebergs from 11 a. m. of the 11th to 4 a. m. of the 12th. Captain Davies reports: "in N. 42° 40′, W. 47° 0′, the temperature fell 20° in one hour (from 66° to 46°)." The s. s. "Roman," in N. 41° 26′, W. 48° 30′, passed seven large icebergs.

12th.—S. S. "Furnessia," between N. 42° 04′, W. 50° 57′, to N. 42° 05′, W. 52° 00′, passed six icebergs; s. s. "Rhaetia," between N. 43° 28′, W. 46° 00′, to N. 43° 13′, W. 46° 58′, from 8.30 a. m. to noon passed several large and small pieces of ice and three icebergs; temperature of air, 47°; water, 51°; from 1 p. m. to 4 p. m., between N. 43° 13′, W. 46° 58′ and N. 43° 06′, W. 48° 10′, passed eight icebergs, three of them very large; temperature of air, 50°; water, 50°; from 4 p. m. to 8.40 p. m., between N. 43° 06′, W. 48° 10′, to N. 43° 00′, W. 49° 20′, passed many small patches of ice and thirteen large icebergs, the three last being about one hundred and fifty to two hundred feet in height; temperature of air, 44°; water, 40°; the s. s. "Gallia," between N. 42° 54′, W. 46° 16′ and N. 42° 09′, W. 48° 29′, passed several icebergs. Captain Murphy reports "between 8 and 10 a. m. the temperature of the water fell from 61° to 47° as the vessel came abreast of the ice at a distance of three miles. The temperature rose again as the ice was cleared." S. S. "Warwick," between N. 44° 00′, W. 46° 40′ and N. 42° 47′, W. 51° 52′, passed a large number of icebergs; schooner "Adelia," in N. 41° 02′, W. 47° 00′, passed five large icebergs and several small ones; s. s. "Nederland," in N. 41° 02′, W. 47° 31′, passed two icebergs; in 40° 58′, W. 47° 45′, passed a large berg.

13th.—S. S. "Nevada," in N. 41° 34′, W. 48° 1′, at 4.30 p. m., passed two icebergs; in N. 41° 26′, W. 48° 29′, at 6.40 p. m., passed one large berg; in N. 41° 27′, W. 48° 37′, at 7.10 p. m., passed a small berg; s. s. "Prussian," in N. 43° 24′, W. 45° 50′, at 11.45 a. m., passed a large iceberg; at 1.30 p. m., in N. 43° 15′, W. 46° 12′, passed another large berg; at 4.15 p. m. passed numerous small ones; bark "Lynwood," in N. 41° 12′, W. 47° 45′, passed five icebergs. Schooner "Adelia," in N. 41° 19′, W. 48° 38′, saw a large iceberg, also passed two bergs in N. 48° 48′, W. 50° 13′; the s. s. "Fulda," in N. 41° 15′, W. 48° 46′, at 5.56 p. m., passed a medium-sized berg; in N. 41°. 9′, W. 48° 39′, at 6.15 p. m., passed another, and in N. 41° 31′, W. 48° 6′, passed a large berg and several small pieces; temperature of air at 5.56 p. m., 57°.2 Fahr. (14°.0 Cent.), water, 55°.4 Fahr. (13°.0 Cent.); at 8 p. m., air, 55°.4 Fahr. (13°.0 Cent.), water, 51°.8 Fahr. (11°.0 Cent.), minimum; s. s. "Wyoming," in N. 41° 41′, W. 48° 44′, at 10.45 a. m., passed a small iceberg and several pieces of ice.

14th.—S. S. "Nymphœa," between N. 42° 18′, W. 48° 10′, and N. 42° 0′, W. 48° 34′, passed twenty-four icebergs, some of which were estimated to be sixty feet high and three hundred feet long; s. s. "Prussian," in N. 42° 32′, W. 49° 25′, at 2.45 p. m., passed a large iceberg, in N. 42° 13′, W. 50° 55′, at 8 a. m., passed another; s. s. "St. Laurent," between N. 42° 18′, W. 49° 20′, and N. 43° 34′, W. 45° 47′, passed about thirty medium-sized icebergs, mostly to the northward.

15th.—S. S. "Nymphœa," in N. 42° 00′, W. 52° 28′, passed a large iceberg; in N. 41° 59′, W. 42° 01′, passed another. S. S. "Rhein," between N. 44° 21′, W. 44° 42′, and N. 43° 13′, W. 45° 05′, passed several large and small icebergs; temperature of air, 59°; water, 55°.4; ship "Arbela," in N. 41° 40′, W. 48° 00′, passed two icebergs.

16th.—S. S. "Greece," in N. 40° 44′, W. 48° 38′, passed a large iceberg. Captain Lewis, commanding the s. s. "City of Richmond," reported: "saw no ice; on June 16th, from 2.52 a. m., in N. 41° 00′, W. 48° 00′, to N. 40° 53′, W. 49° 20′, at 10.40 a. m., had a very dense fog; at 3 a. m. a sudden fall in temperature of the sea-water was observed, going from 64° at 2.30 a. m. to 50° at 3 a. m., and then to 48°; ship going dead-slow; at 10 a. m. the temperature of the water began to rise."

17th.—S. S. "Britannic," between N. 43° 21′, W. 48° 00′, and N. 42° 50′, W. 49° 03′, from 9.54 a. m. till 1.56 p. m., passed thirteen icebergs and some detached ice; s. s. "Sussex," between N. 46° 00′, W. 44° 00′, and N. 45° 30′, W. 46° 00′, passed two large icebergs; s. s. "Scythia," in N. 43° 09′, W. 49° 32′, passed a large iceberg; at 11 a. m., in N. 42° 59′, W. 51° 40′, passed another; s. s. "Virginian," in N. 45° 14′, W. 41° 12′, at 4 p. m., passed a medium-sized iceberg; s. s. "Grecian," in N. 50° 30′, W. 43° 20′, passed two large icebergs.

18th.—S. S. "Waldensian," in N. 42° 30′, W. 41° 20′, sighted a small iceberg.

19th.—S. S. "Pieter de Coninck," in N. 43° 00′, W. 50° 05′, at 4 p. m., passed an iceberg; lowest temperature of water, 42°; s. s. "Siberian," in N. 50° 32′, W. 42° 10′, passed three iceberg; also in N. 50° 12′, 43° 45′, passed another.

20th.—S. S. "Grecian Monarch," in N. 43° 13′, W. 48° to 57°, saw several icebergs; s. s. "State of Georgia," between N. 46° 17′, W. 44° 34′, and N. 44° 52′, W. 46° 38′, saw numerous icebergs; s. s. "Ontario," in N. 48° 36′, W. 44° 13′, passed a large iceberg, in N. 48° 23′, W. 45° 27′, passed another; s. s. "Siberian," in N. 48° 47′, W. 47° 25′, passed a large iceberg and much drift-ice.

21st.—S. S. "State of Georgia," between N. 43° 39′, W. 48° 50′ and N. 42° 58′, W. 52° 15′, passed numerous icebergs.

22d.—S. S. "Olinde Rodriques," in N. 42° 27′, W. 50° 54′, at 1 p. m., passed an iceberg about one hundred feet high and six hundred and fifty feet long; at 7 p. m. in N. 42° 20′, W. 52° 22′, passed another, one hundred feet high and three hundred feet long. Captain Padel reports: "the proximity of the icebergs (less than two miles) did not cause the temperature of the water to fall more than half a degree; it being between 50° and 51°.8 F., without change." The s. s. "Hammonia," in N. 41° 22′, W. 47° 47′, passed a large iceberg; s. s. "Siberian," in N. 47° 3′, W. 57° 9′, passed a large iceberg.

23d.—S. S. "City of Rome," in N. 41° 52′, W. 51° 30′, passed two icebergs about forty feet high; s. s. "Adriatic," between N. 42° 26′, W. 51° 38′, and N. 42° 31′, W. 50° 29′, passed three medium-sized icebergs.

24th.—S. S. "Cephalonia," in N. 41° 23′, W. 48° 55′, at 2.40 p. m. passed a large iceberg.

25th.—S. S. "Etruria," in N. 41° 12′, W. 48° 25′, passed a large iceberg.

26th.—S. S. "Austrian," in N. 45° 23′, W. 45° 4′, passed a large iceberg; in N. 43° 20′, W. 45° 36′, passed another; s. s. "Circassian," in N. 48° 1′, W. 50° 38′, passed four icebergs; in N. 47° 56′, W. 50° 49′, passed five bergs; in N. 46° 53′, W. 52° 18′, passed one berg, and passed another six miles east of Cape Race.

27th.—S. S. "State of Indiana," in N. 43° 34′, W. 45° 51′, passed an iceberg and several pieces; s. s. "Westernland," in N. 41° 18′, W. 47° 54′, passed a large iceberg.

28th.—S. S. "East Anglia," in N. 42° 50′, W. 49° 0′, to W. 51° 40′, from 3 a. m. to 4 p. m., passed about sixty large icebergs; s. s. "Austrian," in N. 43° 13′, W. 49° 48′, passed a large iceberg; in N. 42° 52′, W. 51° 2′, passed two bergs, and in N. 42° 12′, W. 50° 55′ passed one berg.

29th.—S. S. "Baltic," in N. 43° 46′, W. 45° 57′, passed a small piece of ice; s. s. "Rialto," in N. 41° 0′, W. 47° 50′, passed a large iceberg: s. s. "York City," in N. 46° 23′, W. 43° 54′, at 11.40 a. m., saw an immense iceberg.

The following reports are taken from the daily ice reports of the "International Nautical Magazine":

1st to 4th.—Brig "Coma," between N. 49° 5′, W. 52° 56′ and N. 49° 50′, W. 53° 10′, passed one hundred and fifty icebergs.

1st.—S. S. "Cydonia," in N. 46° 30′, W. 53° 30′, passed a large iceberg about ten miles north.

2d.—S. S. "Trinacria," in N. 41° 24′, W. 48° 26′, passed a medium-sized iceberg.

3d.—S. S. "Celtic," between N. 41° 20′, W. 48° 2′ and N. 41° 30′, W. 49° 50′, passed seven icebergs.

8th.—S. S. "California," in N. 41° 50′, W. 49° 30′, at 4 a. m., passed a large iceberg, and from N. 41° 49′, W. 50° 0′ to N. 41° 48′, W. 51° 30′, passed twenty-four icebergs and several pieces of ice.

9th.—S. S. "Brooklyn City," in N. 44° 6′, W. 47° 40′, passed several large and small pieces of ice; in N. 44° 0′, W. 47° 50′, at 11 a. m., passed a large iceberg; in N. 44° 0′, W. 48° 15′, at 3.45 p. m., passed an iceberg about one hundred and fifty feet high and half a mile long.

11th.—S. S. "Martha," in N. 43° 21′, W. 46° 25′, at 6 p. m., passed several icebergs.

12th.—S. S. "Martha," in N. 42° 9′, W. 50° 14′, at 4.30 a. m., passed a large iceberg.

14th.—S. S. "St. Simon," in N. 41° 10′, W. 49° 30′, passed three icebergs, one of which was about one hundred and fifty feet high and about six hundred feet long; also large quantities of broken ice.

15th.—S. S. "Ludgate Hill," between N. 45° 11′, W. 45° 19′ and N. 44° 45′, W. 47° 8′, passed about thirty-five icebergs of various sizes; s. s. "W. A. Scholten," between N. 43° 46′, W. 47° 8′ and N. 43° 29′, W. 48° 1′, passed fourteen icebergs.

16th—S. S. "W. A. Scholten," in N. 42° 55′, W. 49° 46′, at 4 a. m. passed two icebergs; in N. 42° 38′, W. 50° 38′, passed several bergs.

20th.—S. S. "Hekla," in N. 46° 20′, W. 44° 30′, at 2 p. m., passed several icebergs.

21st.—S. S. "Jersey City," from N. 46° 21′, W. 44° 36′ to N. 46° 1′, W. 45° 32′, passed two icebergs.

22d.—S. S. "Jersey City," in N. 44° 56′, W. 49° 0′, passed a very large iceberg.

SIGNAL SERVICE AGENCIES.

Signal Service agencies have been established in the Maritime Exchange buildings at New York and Philadelphia, and in the Custom-House, Boston, where the necessary blanks and other information will be furnished to ship-masters. In the REVIEW for January, 1885, was published an explanation of the object of these agencies.

In pursuance of the arrangements made with the Meteorological Office of London, England, there were cabled to that office from New York during June, 1885, twenty reports concerning storms and icebergs encountered by vessels in the Atlantic west of the forty-fifth meridian; seven messages were sent from Boston.

TEMPERATURE OF THE AIR.

[*Expressed in degrees, Fahrenheit.*]

The distribution of mean temperature over the United States and Canada for June, 1885, is exhibited on chart ii. by the dotted isothermal lines; and in the table of miscellaneous meteorological data are given the means for the various stations of the Signal Service.

On chart iv. the departures from the normal temperatures are graphically exhibited by the lines connecting stations of equal departure, and in the table of miscellaneous data are given the departures for the several stations.

From chart iv. it will be seen that the temperature for June was below the normal in all districts except along the New England coast, in portions of Idaho, Washington Territory, and the Gulf states. The departures below the normal nowhere exceeded 5°, and except in the middle and southern plateau districts and portions of the Ohio valley and lake region, they have been less than 4°.

In the districts where the mean temperatures were above the normal the departures have been slight, only three stations showing deviations of more than 1°, viz: Olympia, Washington Territory, 2°.6; Galveston, Texas, 1°.6; and New Orleans, Louisiana, 1°.2.

In the following table are given the mean temperatures for the several geographical districts with the normals and departures, as deduced from the Signal Service observations:

Average temperatures for June, 1885.

Districts.	Average for June, Signal-Service observations.		Comparison of June, 1885, with the average for several years.
	For several years.	For 1885.	
	°	°	°
New England	64.3	64.1	— 0.2
Middle Atlantic states	70.7	69.7	— 1.0
South Atlantic states	76.9	76.5	— 0.4
Florida peninsula	80.8	80.6	— 0.2
Eastern Gulf states	78.7	79.1	+ 0.4
Western Gulf states	80.1	80.5	+ 0.4
Rio Grande valley	84.2	83.5	— 0.7
Tennessee	75.9	76.0	+ 0.1
Ohio valley	73.2	70.7	— 2.5
Lower lake region	67.0	64.1	— 2.9
Upper lake region	61.5	59.4	— 2.1
Extreme northwest	62.6	60.4	— 2.2
Upper Mississippi valley	71.0	69.7	— 1.3
Missouri valley	69.8	68.3	— 1.5
Northern slope	62.3	59.8	— 2.5
Middle slope	70.0	68.6	— 1.4
Southern slope	77.9	77.5	— 0.4
Southern plateau	75.3	71.7	— 3.6
Middle plateau	65.9	61.8	— 4.1
Northern plateau	65.0	63.9	— 1.1
North Pacific coast region	60.6	60.4	— 0.2
Middle Pacific coast region	64.6	62.1	— 2.5
South Pacific coast region	71.9	70.1	— 1.8
Mount Washington, N. H	43.9	46.2	— 1.3
Pike's Peak, Colo	32.7	29.8	— 2.9

RANGES OF TEMPERATURE.

The monthly, and the greatest and least daily ranges of temperature are given in the table of miscellaneous data.

The monthly ranges were greatest in the extreme northwest and in the Rocky mountain districts; they were least at the stations on the Gulf and Pacific coasts. The following are some of the extreme monthly ranges: greatest, 77° at Phœnix, Arizona; 63°.5 at Willcox, Arizona; 61°.3 at San Carlos, Arizona; and 60°.5 at Fort Benton, Montana; least, 17°.5 at San Francisco, California; 18°.6 at Galveston, Texas; and 19°.3 at Fort Canby, Washington Territory.

DEVIATIONS FROM MEAN TEMPERATURE.

The departures exhibited by the reports from the regular Signal Service stations are shown in the table of average temperatures for the several geographical districts; in the table of

miscellaneous meteorological data, and on chart iv. The following notes in connection with this subject are reported by voluntary observers:

Arkansas.—Lead Hill, Boone County: mean temperature, 80°.2, is 3°.9 above the June average for the last three years.

California.—Princeton, Colusa county: mean temperature, 69°.8, is 6°.3 below the June average for the last twelve years.

Dakota.—Webster, Day county: mean temperature, 67°.4, is 4°.7 below the June average for the three preceding years.

Georgia.—Milledgeville, Baldwin county: mean temperature, 79°.2, is about the June average.

Illinois.—Riley, McHenry county: mean temperature, 64°7, is 1°.6 below the June average for the last twenty-four years.

Anna, Union county: mean temperature, 76°.5, is 1°.9 above the June average for the last ten years.

Peoria, Peoria county: mean temperature, 73°.2, is 0°.2 below the June normal for a period of thirty years.

Table of comparative maximum temperatures for the month of June.

State or Territory.	Maximum for June, 1885, Signal Service.		Maximum since Signal-Service stations were opened—3 to 14 years.			Highest from any other source.			
	Station.	Temperature.	Station.	Temperature.	Year.	Place.	Temperature.	Year.	Length of record.
		°		°			°		Years.
Alabama	Montgomery	95.2	Montgomery	105.5	1881	Mount Vernon Arsenal	102	1876	35
Do	Mobile	93.4	Mobile	100	1877, 1882	Mobile	96		34
Arizona	Prescott	88.7	Prescott	102	1878	Fort Mojave	119	1876	13
Do	Phœnix	109.8	Yuma	117	1883	Fort Lowell	116	1879	12
Arkansas	Fort Smith	92.8	Fort Smith	101	1882	Fort Smith	99		21
Do	Little Rock	95.0	Little Rock	98	1882	Little Rock	95		28
California	San Francisco	67.0	San Francisco	95	1883	Benicia Barracks	103		25
Do	San Diego	74.5	San Diego	94	1877	San Diego	102		16
Colorado	Denver	86.2	Denver	99	1873	Fort Lyon	107		22
Do	Pike's Peak	43.6	Pike's Peak	63	1881	Fort Garland	93		24
Connecticut	New Haven	89.3	New Haven	92	1880, 1884	New Haven	102	1864	87
Do	New London		New London	89	1880	Fort Trumbull	93		48
Dakota	Fort Sully	96.6	Fort Sully	111	1874, 1876	Fort Sully	108		16
Do	Yankton	92.1	Yankton	97	1876	Fort Buford	106	1868, 1870	15
Delaware	Cape Henlopen	93.2	Delaware Breakwater	89	1880	Fort Delaware	97		45
District of Columbia	Washington City	95.1	Washington City	102.5	1874	Washington City	99		49
Florida	Pensacola	93.1	Pensacola	97	1881	Fort Barrancas	104	1854	57
Do	Key West	93.2	Key West	95.5	1881	Key West	97		44
Georgia	Augusta	99.0	Augusta	101.8	1881	Augusta Arsenal	100		49
Do	Savannah	95.0	Savannah	100	1880	Savannah	102	1839, 1845	38
Idaho	Boisé City	98.6	Boisé City	96	1878	Fort Boisé	107	1870	15
Do	Lewiston	91.0	Lewiston	98	1883	Fort Lapwai	105		16
Illinois	Chicago	87.7	Chicago	98	1872	Chicago	102		38
Do	Cairo	92.0	Cairo	96	1872	Rock Island Arsenal	102	1870?, '73?	12
Indiana	Indianapolis	90.1	Indianapolis	96	1874	Vevay	100	1865?, '66?	14
Do						Spiceland	97		7
Indian Territory	Fort Reno	95.3	Fort Gibson	100	1879, 1881	Fort Gibson	103		48
Do	Fort Sill	93.0	Fort Sill	105	1881	Fort Sill	103		9
Iowa	Dubuque	88.0	Dubuque	98	1874	Dubuque	102	1870	11
Do	Keokuk	88.8	Keokuk	96	1873	Muscatine	96		27
Kansas	Leavenworth	96.0	Leavenworth	99	1875	Fort Leavenworth	103		44
Do	Dodge City	95.0	Dodge City	102	1880	Fort Wallace	108	1879	7
Kentucky	Louisville	94.5	Louisville	100	1874	Newport Barracks	96		27
Louisiana	New Orleans	91.7	New Orleans	97	1881	New Orleans	98		51
Do	Shreveport	97.8	Shreveport	104	1875	Baton Rouge	98		53
Maine	Eastport	81.6	Eastport	82	1884	Gardiner	94		34
Do	Portland	90.1	Portland	94	1878	Portland	92		38
Maryland	Baltimore	95.3	Baltimore	97.5	1874	Fort Washington	105	1853	38
Massachusetts	Boston	91.9	Boston	98	1874	Fort Independence	99	1854, 1872	47
Do			Springfield	94	1880	New Bedford	95		58
Michigan	Alpena	87.0	Alpena	97	1874	Fort Brady	96		52
Do	Detroit	87.0	Detroit	93	1874	Detroit	95		35
Minnesota	Saint Paul	88.6	Saint Paul	94	1874	Saint Paul	99	1870	7
Do	Saint Vincent	84.1	Saint Vincent	93	1883	Fort Snelling	96		55
Mississippi	Vicksburg	96.2	Vicksburg	101	1881	Vicksburg	97		4
Missouri	Saint Louis	92.0	Saint Louis	99	1881	Saint Louis	100		39
Montana	Fort Benton	98.5	Fort Benton	101	1881	Fort Benton	104		10
Do	Fort Shaw	88.7	Fort Shaw	96	1880	Fort Shaw	101		7
Nebraska	North Platte	88.8	North Platte	101	1876	Fort McPherson	108	1876	13
Do	Omaha	93.8	Omaha	98	1881	Fort Kearney	101		19
Nevada	Winnemucca	87.8	Winnemucca	95	1881	Camp Halleck	111	1871	15
New Hampshire	Mount Washington	63.2	Mount Washington	71	1878	Fort Constitution	96	1850?, '52?	34
New Jersey	Sandy Hook	90.4	Sandy Hook	97	1874	Atco	102	1875	8
Do	Cape May	85.2	Cape May	89	1873, 1880	Newark	95	1864	10
New Mexico	Santa Fé	82.5	Santa Fé	92	1881	Santa Fé	98		25
Do	Lava	101.8	La Mesilla	107.8	1881	Fort McRae	120	1873	11
New York	Oswego	85.0	Oswego	98	1875	Fort Hamilton	106	1804	39
Do	New York City	90.6	New York City	95	1875	Albany	94		55
North Carolina	Wilmington	93.0	Wilmington	100	1880	Fort Johnson	99		57
Do	Kitty Hawk	96.5	Kitty Hawk	99	1880	Fort Macon	96		16
Ohio	Cincinnati	89.9	Cincinnati	98.5	1874	College Hill	100	1881	64
Do	Cleveland	88.4	Cleveland	96	1874	Marietta	99		54
Oregon	Portland	86.2	Portland	99	1876	Fort Dalles	104		15
Do	Roseburg	84.7	Roseburg	96.5	1878	Astoria	84		20
Pennsylvania	Pittsburg	94.3	Pittsburg	98	1874	Carlisle Barracks	100		37
Do	Philadelphia	93.0	Philadelphia	97	1874	Philadelphia	98		113
Rhode Island	Block Island	77.4	Newport	89	1876	Providence	97		35
South Carolina	Charleston	96.4	Charleston	100	1877, 1880	Charleston	96		105
Tennessee	Memphis	95.7	Memphis	100	1881	Humboldt	104	1871?, '74?	4
Do	Nashville	92.1	Nashville	99	1874	Glenwood College	91		11
Texas	Fort Davis	97.7	Fort Davis	111	1881	Fort Ringgold	114	1877	32
Do	El Paso	106.6	El Paso	113	1883	Fort Duncan	112	1860	31
Utah	Salt Lake City	90.9	Salt Lake City	100	1883	Mount Carmel	107	1876	3
Vermont			Burlington	94	1878	Lunenburg	98		16
Virginia	Norfolk	96.9	Norfolk	102	1874	Fortress Monroe	97		56
Do	Lynchburg	93.1	Lynchburg	97	1874	Accotink	98	1881	7
Washington Territory	Dayton	89.7	Dayton	97.5	1884	Fort Walla Walla	106	1876	12
Do	Olympia	82.0	Olympia	95	1878	Fort Vancouver	98		19
West Virginia			Morgantown	93	1874	Weston	94	1875	2
Wisconsin	La Crosse	86.6	La Crosse	96	1874	Fort Howard	100		30
Do	Milwaukee	85.6	Milwaukee	94	1872, 1874	Milwaukee	100	1870	11
Wyoming	Cheyenne	81.1	Cheyenne	97	1880, 1881	Fort Fred Steele	104	1871	15

Mattoon, Coles county: mean temperature, 71°.6, is 1° below the June average for the last five years.

Swanwick, Perry county: mean temperature, 72°.4, is 0°.4 below the June average for the last four years.

Collinsville, Madison county: mean temperature, 72°.1, is 2° below the June average.

Sycamore, De Kalb county: mean temperature, 65°.5, is about the normal for June.

Indiana.—Vevay, Switzerland county: mean temperature, 71°.9, is 2°.2 below the June average for the last twenty-one years.

Logansport, Cass county: mean temperature, 74°.3, is 3°.2 below the June average for the last twenty-six years.

Wabash, Wabash county: mean temperature, 70°.4, is 0°.5 above the June average for the last nine years.

Spiceland, Henry county: mean temperature, 68°.5, is 2° below the June average for a period of thirty-one years.

Kansas.—Wellington, Sumner county: mean temperature, 74°.4, is 0°.5 above the June average for the last seven years.

Yates Centre, Woodson county: mean temperature, 71°.1, exactly coincides with the June average for the last five years.

Independence, Montgomery county: mean temperature, 72°.9, is 2° below the June average for the last fourteen years.

Lawrence, Douglas county: mean temperature, 72°.6, is 1°.2 below the June average for the last seventeen years.

Maine.—Gardiner, Kennebec county: mean temperature, 62°.1, is 1°.3 below the June average for the last forty-nine years.

Maryland.—Fallston, Harford county: mean temperature, 68°.3, is 2°.2 below the June average for a period of twelve years.

Massachusetts.—Somerset, Bristol county: mean temperature, 69°.1, is 0°.2 below the June average.

Worcester, Worcester county: June is the tenth consecutive month the mean temperature for which has been below the normal; the normal for a period of forty-seven years is 65°.8; for June, 1885, it is 63°.5, or 2°.1 lower.

New Jersey.—South Orange, Essex county: mean temperature, 68°.2, is 1°.7 below the June average for the last fifteen years.

New York.—North Volney, Oswego county: mean temperature, 62°.5, is 2°.5 below the June average for seventeen years.

Palermo, Oswego county: mean temperature, 61°.1, is 4°.6 below the June average for the last thirty-two years.

Ohio.—Wauseon, Fulton county: mean temperature, 66°.5, is 2°.0 below the June average for fifteen years.

Pennsylvania.—Dyberry, Wayne county: mean temperature, 61°.2, is 3°.4 below the June average for a period of nineteen years.

Texas.—New Ulm, Austin county: mean temperature, 81°.2, is 0°.7 above the June average for the last thirteen years.

Vermont.—Woodstock, Windsor county: mean temperature, 64°.3, is 0°.4 above the June average for the last eighteen years.

Virginia.—Wytheville, Wythe county: mean temperature, 70°.6, is 2°.4 above the normal for a period of twenty-two years.

Dale Enterprise, Rockingham county: mean temperature, 75°.3, is 5°.3 above the June average for the last five years.

West Virginia.—Helvetia, Randolph county: mean temperature, 65°.7, is 0°.4 below the June average for the last nine years.

FROSTS.

Frosts are reported to have occurred in the various states and territories as follows:

Arizona.—Fort Grant, 6th.

California.—Blue Lake, 6th.

Colorado.—Pike's Peak, 3d, 5th, 8th, 15th, 22d, 28th, 29th; Montrose, 8th; Fort Lewis, 6th, 7th, 8th.

Connecticut.—North Colebrook, 6th, 10th.

Dakota.—Fort Buford and Fort Yates, 8th; Bismarck, 8th, 9th, 22d, 23d; Huron, 8th, 22d; Yankton, 9th, 22d; Deadwood, 8th, 15th, 16th; Fort Meade, 16th; Webster, 8th, 9th, 22d.

Idaho.—Albion, 8th.

Illinois.—Mattoon, Wilton Centre and Charleston, 9th.

Indiana.—Logansport, Wabash, and La Fayette, 9th; Spiceland, 9th, 22d.

Iowa.—Des Moines, Cresco, West Union, and Muscatine, 9th; Dubuque and Manchester, 9th, 22d.

Maine.—Orono, 3d; Gardiner, 6th, 10th.

Massachusetts.—Rowe, 6th; Amherst, 10th.

Michigan.—Marquette, 8th; Lansing, 9th; Escanaba, 8th, 9th, 22d, 29th; Grand Haven, 9th, 10th, 22d, 29th; Buchanan, 9th, 10th, 13th, 16th, 17th, 22d, 29th, 30th; Manistique, 7th, 8th, 22d, 29th; Traverse City, 21st, 29th; Birmingham, 21st, 30th; Thornville, 22d; Hudson and Port Huron, 23d; Alpena, 29th.

Minnesota.—Duluth, 8th; Saint Vincent and Moorhead, 8th, 22d; Northfield, 8th, 9th; Chester, 9th, 20th.

Montana.—Fort Shaw and Helena, 8th; Fort Maginnis, 15th.

Nebraska.—Stockham, 8th; Columbus, 8th, 22d.

Nevada.—Winnemucca, 6th, 12th; Carson City, 4th, 6th, 7th, 11th to 14th, 26th.

New Hampshire.—Mount Washington, 1st, 8th, 9th, 10th, 23d.

New Jersey.—Dover, 10th.

New Mexico.—Santa Fé, 6th.

New York.—Oswego and Auburn, 3d; Ithaca, 6th; Humphrey, 10th; Factoryville and Menand Station, 6th, 10th; North Volney, 23d.

Ohio.—North Lewisburg, Westerville, Wauseon, and Yellow Springs, 9th; Garrettsville, 9th, 10th.

Oregon.—Fort Klamath, 6th.

Pennsylvania.—Dyberry, 2d, 3d, 10th; Wellsborough, 2d, 3d, 6th, 18th, 23d; Grampian Hills, 9th, 10th; Troy, 5th, 9th; Drifton, 9th.

Utah.—Nephi, 6th.

Vermont.—Strafford and Woodstock, 6th, 10th; Wooster Mountain, 9th, 24th; Dorset, 6th, 10th, 11th.

Wisconsin.—La Crosse, 22d, 23d; Embarras, 9th, 29th; Neillsville, 8th, 9th, 10th, 16th, 22d, 29th; Wausau, 8th, 9th, 29th.

Wyoming.—Fort Bridger, 7th, 8th; Cheyenne, 15th.

The following reports of injury to vegetation by the frosts of June have been reported:

Fort Grant, Arizona: a very low temperature (48°.8) for this season, occurred on the 6th; light frost was noticeable at this station, and a heavy frost occurred a few miles to the northward.

Saint Vincent, Minnesota: a killing frost occurred here on the morning of the 8th,

Moorhead, Minnesota: the frost on the 8th caused injury to garden vegetables and corn.

Huron, Dakota: a killing frost was reported from districts north of this place on the 8th.

Albion, Idaho: a killing frost occurred here on the 8th.

Northfield, Minnesota: a very light frost occurred on the 8th; on the 9th there was a heavy frost, but no damage was caused, except to tender vegetation in the lowlands.

Grand Haven, Michigan: reports from inland towns state that the frost on the morning of the 10th caused considerable damage to vegetation.

The "New York Journal of Commerce," of June 23d, contained the following:

Dispatches from the western part of the lower peninsula of Michigan report heavy frosts last night, with considerable damage to corn and other growing crops.

ICE.

The following instances of ice formation have been reported:
Fort Lewis, Colorado, 6th, 7th, one-fourth inch in thickness.
Mount Washington, New Hampshire, 2d.

PRECIPITATION.

[Expressed in inches and hundredths.]

The distribution of rainfall over the United States and Can-

ada for June, 1885, as determined from reports of observations made at more than eight hundred stations, is exhibited on chart iii.

In the following table are shown, for each of the geographical districts, as deduced from Signal Service observations—the average June precipitation for a series of years, the average for June, 1885, and the departures from the normal:

Average precipitation for June, 1885.

Districts.	Average for June. Signal-Service observations.		Comparison of June, 1885, with the average for several years.
	For several years.	For 1885.	
	Inches.	*Inches*	*Inches.*
New England	3.76	3.33	−0.43
Middle Atlantic states	3.59	2.31	−1.28
South Atlantic states	5.01	5.80	+0.79
Florida peninsula	6.20	7.36	+1.16
Eastern Gulf states	4.94	4.23	−0.71
Western Gulf states	3.53	2.97	−0.56
Rio Grande valley	1.00	0.27	−1.33
Tennessee	4.57	3.62	−0.95
Ohio valley	4.44	4.22	−0.22
Lower lake region	3.76	5.25	+1.49
Upper lake region	4.23	4.04	−0.19
Extreme northwest	3.62	4.82	+1.20
Upper Mississippi valley	5.62	5.04	−0.58
Missouri valley	4.82	4.29	−0.53
Northern slope	2.23	4.16	+1.93
Middle slope	3.40	4.64	+1.24
Southern slope	2.98	4.18	+1.20
Southern plateau	0.42	0.60	+0.18
Middle plateau	0.70	2.54	+1.84
Northern plateau	1.20	2.74	+1.54
North Pacific coast region	1.34	1.36	+0.02
Middle Pacific coast region	0.35	0.75	+0.40
South Pacific coast region	0.10	0.02	−0.08
Mount Washington, N. H.	9.45	11.34	+1.89
Pike's Peak, Colo	1.83	1.39	−0.44

A comparison of the reports from the several stations with the average for a number of years, shows the precipitation for June, 1885, to have been deficient from the Rio Grande river eastward to Georgia, in southern Florida, Tennessee, the Ohio valley, middle Atlantic states, along the coast of Washington territory and over an area extending from Kansas, northeastward to the upper lake region. In all other districts, the precipitation for June, 1885, has been in excess of the average.

The following are some of the most marked departures, both above and below the normal: Fort Elliott, Texas, +6.87; Cedar Keys, Florida, +4.83; Moorhead, Minnesota, +4.12; Fort Benton, Montana, +3.75; Fort Maginnis, Montana, +3.56; Omaha, Nebraska, −4.06; Des Moines, Iowa, −3.36; Block Island, Rhode Island, −3.08; Escanaba, Michigan, −2.85; Indianola, Texas, −2.53.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The departures exhibited by the reports from the regular Signal Service stations, are shown in the table of average precipitation for the several geographical districts, and also in the table of miscellaneous meteorological data. The following notes in connection with this subject are reported by voluntary observers:

Arkansas.—Lead Hill, Boone county: monthly precipitation, 3.69, is 1.96 below the June average for the last three years.

Mount Ida, Montgomery county: monthly precipitation, 7.30, is the largest recorded in June during the last eleven years.

Dakota.—Webster, Day county: monthly precipitation, 8.88, is 2.75 above the June average for the last three years.

Georgia.—Milledgeville, Baldwin county: monthly precipitation, 4.06, is 0.70 below the June normal.

Illinois.—Riley, McHenry county: monthly precipitation, 5.80, is 1.69 in excess of the June average for the last twenty-four years.

Anna, Union county: monthly precipitation, 6.89, is 0.72 above the June average for the last ten years.

Mattoon, Coles county: monthly precipitation, 6.70, is 1.67 above the June average for the last five years.

Swanwick, Perry county: monthly precipitation, 5.66, is 0.61 above the June average for the last four years.

Collinsville, Madison county: monthly precipitation, 7.42, is 1.94 above the June average.

Sycamore, De Kalb county: monthly precipitation, 7.04, is 0.38 below the June average for the last four years.

Indiana.—Vevay, Switzerland county: monthly precipitation, 3.82, is 1.05 below the June average for the last twenty-one years.

Logansport, Cass county: monthly precipitation, 5.23, is 1.42 above the June average for the last twenty-six years.

Wabash, Wabash county: monthly precipitation, 5.87, is 1.23 above the June average for the last nine years.

Spiceland, Henry county: monthly precipitation, 3.64, is 0.64 below the June average for a period of twenty-seven years.

Kansas.—Wellington, Sumner county: monthly precipitation, 3.60, is 0.68 below the June average for the last seven years.

Yates Centre, Woodson county: monthly precipitation, 3.06, is 1.65 below the June average for the last five years.

Independence, Montgomery county: monthly precipitation, 5.27, is 0.50 below the June average for the last thirteen years.

Lawrence, Douglas county: monthly precipitation, 2.39, is 2.65 below the June average for the last seventeen years.

Maine.—Gardiner, Kennebec county: monthly precipitation, 5.06, is 1.77 in excess of the June average for the last forty-seven years.

Maryland.—Fallston, Harford county: monthly precipitation, 4.01, is 0.19 below the June average for the last fourteen years.

Massachusetts.—Somerset, Bristol county: monthly precipitation, 2.41, is 1.15 below the June average.

Worcester, Worcester county: monthly precipitation, 3.49, is in excess of the June average for a period of forty-five years.

South Carolina.—Kirkwood (near Camden), Kershaw county: the following table showing the monthly and annual rainfall, with number of rainy days in each year, beginning with January, 1866, has been furnished by Mr. Colin Macrae. It will be seen that the rainfall for June, 1885, exceeds the average by 1.66, and in but three years of the period covered by the record has it been greater:

Months.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	Monthly normals.
January	1.43	2.12	5.89	2.48	2.85	0.97	2.44	2.67	2.36	4.96	0.60	2.83	4.41	1.76	1.65	5.55	3.13	5.79	5.35	6.22	3.23
February	2.43	2.08	4.65	3.22	3.83	7.07	6.28	4.59	4.82	4.99	3.60	2.34	0.76	3.06	2.56	3.77	2.11	1.64	2.73	3.65	3.51
March	1.43	2.85	1.76	2.12	6.60	2.77	5.31	1.26	3.78	6.03	2.83	4.46	0.63	2.35	5.22	4.05	4.18	3.77	4.73	1.40	3.28
April	4.89	2.71	6.40	1.31	3.00	3.02	1.05	2.06	7.70	3.81	3.46	4.83	3.34	3.74	4.72	3.78	3.78	3.97	3.82	1.62	3.65
May	5.61	2.73	1.61	1.93	3.57	5.12	1.70	6.53	1.80	4.32	2.66	1.32	1.58	2.23	0.48	1.04	3.86	3.74	3.54	5.02	3.02
June	4.00	5.52	1.84	1.79	4.68	3.39	4.91	2.44	6.23	2.31	7.43	3.20	4.98	1.49	1.96	0.58	3.98	4.64	3.19	5.36	3.70
July	2.52	1.24	8.40	4.22	4.64	2.09	4.53	4.62	7.22	5.49	6.60	4.67	6.42	4.60	7.30	0.39	2.98	1.65	5.54	.....	4.48
August	3.20	10.22	7.26	2.52	5.27	4.96	3.80	9.94	2.36	5.08	1.82	1.26	14.75	4.39	2.98	3.66	8.43	2.72	1.77	.....	5.07
September	0.80	4.58	4.61	1.11	1.22	1.82	2.47	8.51	5.03	3.68	4.46	6.76	6.82	2.07	4.13	3.95	3.87	2.77	4.71	.....	3.86
October	2.62	5.33	3.47	0.35	5.60	2.77	1.83	0.51	1.40	1.10	1.78	3.32	1.32	1.42	1.34	2.77	2.71	2.74	0.04	.....	2.33
November	1.46	1.97	0.00	2.38	1.59	4.19	2.23	2.57	1.94	3.16	2.61	4.37	2.68	1.33	4.03	2.55	2.97	2.73	1.11	.....	2.41
December	2.69	2.92	5.21	6.67	2.98	2.17	2.00	2.49	2.77	3.86	3.33	4.80	3.31	1.93	2.67	3.61	5.23	1.79	4.02	.....	2.57
Total for year	33.08	44.27	51.10	30.10	45.83	40.34	38.55	48.19	47.41	48.79	41.18	44.16	51.00	30.37	39.04	35.70	47.23	37.95	40.55	.....	41.83
Rainy days in each year	73	74	90	55	49	58	70	70	80	97	73	44	72	86	82	77	83	70	79	.....	72.7

NOTE.—Position of station, lat. N. 34° 17′, long. W. 80° 33′. Rain-gauge above tide water at Charleston, S. C., 232 feet. Mean annual rainfall for a period of nineteen years, 41.83 inches. Annual average number of days of precipitation for nineteen years, 72.7.

Table of excessive and greatest monthly precipitation—June, 1885.

Station.	Specially heavy. Date.	Amt.	Largest monthly. Amount.
Alabama.			
Greenville	16	3.98	9.16
Do	23	2.55	
Mount View	12	4.90	8.00
Do	22	2.00	
Mt. Vernon B'ks			6.79
Tuscumbia	21	2.65	6.56
Fort Deposit	13	2.07	
Montgomery	22	2.51	
Arkansas.			
Mount Ida	10	2.10	7.30
Lead Hill	15, 16	2.30	
Dakota.			
Webster	3	2.22	8.88
Do	5	2.19	
Fort Randall			6.16
Fort Buford	6, 7	3.61	6.05
Fort Sully	5, 6	2.02	
Florida.			
Archer	13, 14	2.60	11.45
Do	17, 18	2.36	
Cedar Keys	4, 5	3.08	10.98
Merritts Island	1	2.00	9.27
Do	11	3.26	
Jacksonville	10	5.11	8.98
Manatee			7.51
Ft. St. Augustine			7.26
Live Oak			6.97
Mayport			6.51
Fernandina	11	3.00	
Georgia.			
Savannah	9	2.01	8.11
Do	10	2.07	
Jesup	25	2.04	8.00
Dalton	7	4.01	6.16
Athens	9, 10	2.24	
Washington	10	2.15	
West Point	7	2.00	
Cartersville	16	2.44	
Illinois.			
Bunker Hill	14, 15	3.34	8.22
Do	20	3.13	
Collinsville	19, 20	3.35	7.42
Sycamore			7.04
Anna	15, 16	3.68	6.89
Mattoon			6.70
Swanwick	20	2.38	
Riley	2	2.39	
Do	20, 21	2.38	
Charleston	15	2.15	
Chicago	2, 3	3.44	
Indiana.			
Greencastle	3, 4	4.06	8.64
Do	15	2.83	
Connersville			7.34
Franklin	15	2.88	6.37
Worthington	15	2.36	
Indianapolis	4	2.87	
Wabash	21	2.75	
Fort Wayne	20, 21	2.60	
Logansport	4	2.10	
Monticello	4	3.07	
Indian Territory.			
Fort Reno	23, 24	3.13	9.41
Fort Sill	17	2.67	8.16
Iowa.			
Logan	3	2.50	9.80
Do	5	3.70	
Do	12, 13	2.00	
Keokuk	13	2.05	6.97
Dubuque	19	2.31	6.16
Fort Madison	12	2.80	
Ottumwa	12, 13	2.72	
Kansas.			
Wyandotte			7.03
Elk Falls			6.59
Independence	24	2.60	
Wellington	19	2.34	
Oswego	23	2.15	
Sherlock	16, 17	2.05	
Kentucky.			
Louisville	15, 26	2.02	
Louisiana.			
Shreveport	9, 10	2.55	
Coushatta	25	2.36	
Grand Coteau	26	2.00	
Maine.			
Mayfield			9.03
Gardiner	29, 30	3.82	
Portland	29, 30	2.61	
Orono	30	2.60	
Eastport	30	2.26	
Maryland.			
Baltimore	28	4.47	6.31
McDonogh	28	2.48	
Fallston	28	2.18	
Massachusetts.			
New Bedford	28, 29	3.38	
Boston	28, 29	2.09	
Michigan.			
Grand Haven	3, 4	2.57	
Minnesota.			
Moorhead	14	2.60	7.92
Park Rapids			7.57
Mankato			7.36
Duluth	11, 12	2.40	
Mississippi.			
Oxford	25, 26	4.05	6.68
Brookhaven	24	2.07	
Missouri.			
Conception	2, 3	2.50	9.25
Do	6, 7	2.14	
Do	19, 20	3.42	
Montana.			
Fort Ellis			7.35
Fort Benton	5, 6	2.53	
Fort Custer	5, 6	2.02	
Fort Maginnis	6, 7	2.21	
Nebraska.			
Tecumseh	3	2.25	
New Hampshire.			
Mt. Washington	1, 2	3.49	11.34
Do	29, 30	3.54	
Woodstock	28, 29	3.94	
New York.			
Penn Yan	22, 23	4.65	7.54
Buffalo	21, 22	3.39	6.39
Le Roy	4, 5	2.10	
Humphrey	22	2.50	
Ithaca	28	2.08	
Oswego	5	2.39	
North Carolina.			
Salisbury	25	7.10	8.60
Lumberton	10	3.03	7.67
Do	27	3.20	
Flat Rock	26, 27	4.51	6.69
Fort Macon	10, 11	2.24	
Ohio.			
Hiram			7.66
Westerville	20, 21	4.59	7.31
Cleveland	4, 5	2.77	7.22
Do	20, 21	3.40	
Jefferson	4, 5	2.16	6.93
Do	21, 22	3.25	
Sandusky	4, 5	2.28	6.61
Do	20, 21	2.43	
Garrettsville			6.05
Ruggles	20, 21	2.50	
Weymouth	20, 21	2.13	
Lordstown	3, 4	3.05	
Upper Sandusky	20, 21	2.14	
Oberlin	4, 5	2.50	
Columbus	21, 22	2.99	
Pennsylvania.			
Erie	5	2.14	6.84
Do	21, 22	3.16	
Franklin			6.75
Dyberry	4, 5	3.00	
Rhode Island.			
Nyatt Point	5, 6	2.25	
Do	28, 29	2.20	
South Carolina.			
Hardeeville	9	5.50	12.95
Do	24	2.52	
Blackville	24	2.56	7.20
Kirkwood	10	3.20	
Kingstree	10	2.60	
Jacksonborough	25	3.52	
Branchville	10	2.20	
Columbia	10	2.70	
Batesburg	10	4.08	
Anderson	9, 10	3.01	
Charleston	17, 18	2.54	
Tennessee.			
Brownsville	12	4.50	9.75
Do	21	2.07	
Dyersburg	11, 12	5.75	7.12
Grand Junction	26, 27	3.67	6.56
Chattanooga	25	2.01	6.09
Milan	12	2.06	
Texas.			
Cleburne	24	2.06	
Galveston	24	2.52	
Fort Concho	27, 28	2.50	
Fort Elliott	22	2.30	9.82
Do	28	2.06	
Utah.			
Salt Lake City	5, 6	2.14	
Vermont.			
Dorset	4, 5	2.23	
Wisconsin.			
Milwaukee			6.49
Beloit	2	2.24	
La Crosse	2	2.28	

New Jersey.—South Orange, Essex county: monthly precipitation, 1.00, is the smallest recorded in June since 1869; the June average for the last fifteen years is 3.21.

New York.—North Volney, Oswego county: monthly precipitation is 3.05, and the average for June for the last thirteen years is 3.11.

Palermo, Oswego county: monthly precipitation, 2.92, is the June average for a period of thirty-two years.

Ohio.—Wauseon, Fulton county: monthly precipitation, 3.83, is 0.67 below the June average for the last thirteen years.

Pennsylvania.—Dyberry, Wayne county: monthly precipitation, 3.92, is 0.62 above the June average for a period of thirteen years.

Quakertown, Bucks county: monthly precipitation, 0.81, is the least recorded in June since 1874; in that month the rainfall was inappreciable.

Texas.—New Ulm, Austin county: monthly precipitation, 0.51, is the least recorded in June during the last thirteen years, the average for that period being 3.80.

Vermont.—Woodstock, Windsor county: monthly precipitation, 2.28, is 1.11 below the June average for the last seventeen years.

Virginia.—Wytheville, Wythe county: monthly precipitation, 1.40, is 2.54 below the June average for a period of twenty-one years.

West Virginia.—Helvetia, Randolph county: monthly precipitation, 4.66, is 1.26 below the June average for the last nine years.

SNOW.

Snow is reported to have fallen at the following stations during the month:

Braddock, Colorado, 5th, 6th, 14th.
Pike's Peak, Colorado, 2d, 9th, 24th, 28th, 29th.
Albion, Idaho, 7th.
Helena, Montana, 7th.
Mount Washington, New Hampshire, 2d, 23d, 24th.
Carson City, Nevada, 3d.
Winnemucca, Nevada, 5th, on mountain; 6th, 10th.
Fort Klamath, Oregon, 5th.
Fort Bridger, Wyoming, 5th.

MONTHLY SNOW-FALLS.

[*Expressed in inches and tenths.*]

Summit, California, 8.0.
Pike's Peak, Colorado, 4.6.
Cisco, California, 4.0.
Braddock, Colorado, 2.1.
Mount Washington, New Hampshire, 1.1.
Toano, Nevada, 0.2.
Emigrant Gap, California, 0.2.
On the summit of Pike's Peak, Colorado, 5.1 of unmelted snow remained on the ground at the end of the month.

SLEET.

Pike's Peak, Colorado, 1st, 2d, 3d, 8th, 15th, 19th, 20th, 22d to 26th, 28th, 29th, 30th.
Mount Washington, New Hampshire, 8th, 9th.

HAIL.

Nashville, Tennessee: a destructive hail storm occurred about one and one-half miles east of Gallatin, Sumner county, on the 1st. The corn and potato crops were destroyed, much window-glass broken, and fowls killed by the hail-stones, some of which were one inch in diameter.

Burlington, Iowa: a destructive hail storm occurred during the afternoon of the 2d. Reports from the surrounding country state that all kinds of crops were badly damaged.

Beloit, Rock county, Wisconsin: hail-stones fell at this place on the 2d, measuring one and one-half inches in diameter; crops were damaged to some extent.

Cedar Rapids, Linn county, Iowa: considerable damage was caused by the hail storm on the 2d.

Milwaukee, Wisconsin: from 5.30 to 5.47 p. m. on the 7th there was a heavy fall of hail which caused much damage to hot-houses in the suburbs, where the hail-stones are reported

to have fallen that measured from five to eight inches in circumference. In localities to the southwest and west of Milwaukee, the storm is reported to have been very destructive.

Rochester, New York: a thunder-storm, accompanied by heavy rain, prevailed from 7.30 to 8.10 p. m. on the 7th, and in the southern part of the city there was a slight fall of hail. Reports from the northern part of Wayne county state that a destructive hail storm occurred there and caused much damage to fruit, the trees being completely stripped of their foliage. The storm passed over Oneida lake into the Mohawk valley, where it is reported to have assumed the character of a tornado. At Utica, Trenton, Holland Patent, and Canajoharie, great damage was done. To the north of Rome the crops were badly damaged by hail, and many buildings were blown down. Buildings were also destroyed at Lasallesville and Oppenheim, in Fulton county.

Port Hope, Province of Ontario: a very severe hail storm occurred on the night of the 7–8th, during which all exposed window-glass was broken. The hail-stones were as large as walnuts, and some were found to measure five inches in circumference. Several barns in this vicinity were blown down or unroofed.

Huron, Dakota: a heavy hail storm is reported to have occurred to the north and northeast of this station during the evening of the 12th; crops were seriously damaged. On the 14th a severe storm passed through the southern part of this (Beadle) county into Sanborn county; it was accompanied by hail which proved destructive to crops. On the 27th a heavy hail storm occurred twenty miles north of this place, destroying crops and causing other damage.

Sherlock, Finney county, Kansas: a destructive hail storm occurred at this place on the 16th. The hail-stones varied from one inch in diameter to the size of hens' eggs; much damage was done to the growing crops.

Fort Yates, Dakota: the hail storm of the 18th caused slight damage to crops in this vicinity; the hail-stones were from one-fourth to one-half inch in diameter and covered the ground to a depth of one inch.

Stockham, Hamilton county, Nebraska: the hail storm of the 19th completely destroyed garden vegetables and caused great damage to crops. The storm was accompanied by high wind which unroofed, or blew down, numerous out-buildings.

Leavenworth, Kansas: a violent thunder-storm prevailed during the night of the 21–22d, accompanied by heavy rain and high wind, the latter reaching a velocity of 32 miles per hour. No damage was done in this city, but at points eight miles south of here considerable damage was done by hail.

Hail storms of less severity are reported to have occurred in the various states and territories as follows:

Arizona.—Fort Grant, 23d; Fort Apache, 27th.

Arkansas.—Lead Hill, 15th.

California.—Blue Lake, 5th.

Colorado.—Braddock, 5th, 12th, 15th, 28th; Pueblo, 17th, 23d; Pike's Peak, 27th, 28th.

Dakota.—Huron and Fort Sully, 5th; Fort Bennett, 5th, 11th, 14th, 26th, 27th; Deadwood, 11th, 18th, 20th, 25th; Fort Meade, 11th, 25th; Vermillion, 12th, 25th; Webster, and Bismarck, 18th; Fort Yates, 20th; Fort Totten, 25th.

District of Columbia.—Washington, 5th.

Idaho.—Albion, 7th; Cœur d'Alene, 12th; Boisé City, 19th.

Illinois.—Sycamore, 7th, 27th; Mattoon, 15th; Swanwick, 20th.

Indiana.—Indianapolis and Logansport, 4th; Jeffersonville, 8th.

Indian Territory.—Fort Sill, 17th.

Iowa.—Keokuk, Fort Madison, and Independence, 2d; Ottumwa, 2d, 12th; Logan, 5th; Des Moines, 6th; Cresco, 7th, 12th; West Union, 12th; Guttenberg, 14th, 27th.

Kansas.—Allison, 1st, 16th; Wyandotte, 3d, 7th, 13th; Independence, 8th; Maud, 10th; West Leavenworth, 12th; Salina, 15th, 19th; Manhattan, 26th.

Kentucky.—Louisville, 8th.

Maine.—Portland and Cornish, 1st.

Maryland.—Baltimore, 5th.

Michigan.—Marquette, 14th; Thornville, 26th.

Minnesota.—Chester, 7th, 20th, 25th; Moorhead, 11th, 16th; Saint Vincent, 20th.

Missouri.—Conception, 7th.

Montana.—Poplar river, 2d, 29th; Fort Maginnis, 19th.

Nebraska.—Stockham, 4th, 5th; Fort Robinson, 5th, 11th; North Platte, 5th, 28th; Omaha, 7th, 12th, 14th; De Soto and Genoa, 12th, 14th; Columbus, 12th, 13th, 14th; Yutan, 15th.

Nevada.—Fort McDermitt, 5th, 9th; Winnemucca, 9th, 12th, 13th, 21st, 23d.

New Hampshire.—Mount Washington, 1st.

New Jersey—Cape May, 5th; Readington, 8th; Little Egg Harbor, 22d.

New Mexico.—Lava, 27th.

New York.—Penn Yan, 7th; Palermo, 8th; Menand Station (near Albany), 9th.

Ohio.—Waseon, 4th; Yellow Springs, 15th.

Oregon.—Albany, 5th.

Pennsylvania.—Pittsburg, 4th; Wellsborough, 7th.

Texas.—Fort Stockton, 10th; Fort Davis, 16th.

Utah.—Nephi, 5th; Salt Lake City, 11th; Frisco, 22d.

Virginia.—Marion and Bruington, 5th; Dale Enterprise, 21st.

Washington Territory.—Fort Townsend, 11th.

Wisconsin.—Prairie du Chien, 7th.

TEMPERATURE OF WATER.

The following table shows the highest and lowest temperatures of water observed at the several stations; the monthly ranges of water temperature; the average depth at which the observations were made; and the mean temperature of the air:

Temperature of water for June, 1885.

Station.	Temperature at bottom.		Range.	Average depth, feet and tenths.	Mean temperature of the air at station.
	Max.	Min.			
	°	°	°		°
Atlantic City, New Jersey	69.9	62.0	7.9	4 8	66.7
Alpena, Michigan	66.8	60.2	6.6	12 5	58.3
Augusta, Georgia	81.3	71.6	9.7	7 7	77.8
Baltimore, Maryland	75.7	65.9	9.8	10 1	72.6
Block Island, Rhode Island	60.2	52.3	7.9	7 5	62.7
Boston, Massachusetts	60.4	45.7	14 7	19 8	66.4
Buffalo, New York	68.0	55.2	12.8	10 2	60.9
Canby, Fort, Washington Territory	64.7	59.6	8.1	14 7	55.8
Cedar Keys, Florida	88.9	81.2	7.7	8 3	81.4
Charleston, South Carolina	83.9	78.0	5.9	41 2	79.5
Chicago, Illinois	65.1	55.3	9.8	8 0	65.4
Chincoteague, Virginia	80.0	68.3	11.7	2 9	69.4
Cleveland, Ohio	73.6	57.1	16.5	14 0	64.5
Detroit, Michigan†					
Duluth, Minnesota	57.9	46.7	11.2	10 0	57.3
Eastport, Maine	44.4	39.4	5.0	14 9	50.1
Escanaba, Michigan	64.0	49.0	15.0	18 7	59.4
Galveston, Texas	86.0	82.0	4.0	12 7	84.1
Grand Haven, Michigan	73.9	62.2	11.7	19 0	59.8
Indianola, Texas	86.6	80.9	5.7	9 0	82.2
Jacksonville, Florida *	85.0	82.0	3.0	18 0	80.1
Key West, Florida	89.8	79.1	10.7	17 2	82.6
Mackinaw City, Michigan	59.1	47.3	11.8	10 0	56.8
Macon, Fort, North Carolina	83.0	70.2	12.8	5 0	74.4
Marquette, Michigan					
Milwaukee, Wisconsin	59.0	50.1	8.9	8 0	60.2
Mobile, Alabama	85.0	77.4	7.6	17 1	77.8
New Haven, Connecticut	70.8	56.9	13.9	10 6	65.2
New London, Connecticut					
New York City	68.7	61.0	7.7	13 6	67.3
Norfolk, Virginia	78.7	71.9	6.8	10 1	74.3
Pensacola, Florida	84.9	79.5	5.4	17 4	80.5
Portland, Maine	54.9	50.8	4.1	16 3	65.3
Portland, Oregon	69.7	59.1	10.6	63 7	61 0
Sandusky, Ohio	75.0	66.5	8.5	11 5	67.0
Sandy Hook, New Jersey	64.9	60.5	4.4	2 0	67.1
San Francisco, California	61.2	56.2	5.0	35 6	56.9
Savannah, Georgia	84.3	76.8	7.5	9 9	79.5
Smithville, North Carolina	83.0	71.8	11.2	10 5	76.4
Toledo, Ohio	75.9	65.7	10.2	13 3	68.3
Wilmington, North Carolina	81.6	75.3	6.3	14 3	76.4

* Record for 15 days. † Thermometer broken.

COTTON REGION REPORTS.

In the following table are given the means of the maximum

and minimum temperatures, and average rainfall for the several cotton districts, for the month of June; the means for the same districts for June of the three preceding years are also given. A comparison of these figures shows a deficiency in the rainfall in all districts, except those of Charleston and Memphis. The means of the maximum and minimum temperatures are higher in nearly all of the districts but the departures in most of them are slight. The reports for the district of Galveston are missing.

Temperature and rainfall data for the cotton districts, June, 1885.

Districts.	Rainfall.			Temperature.							
				Maximum.			Minimum.			Extremes for June, 1885.	
	Average for June of three preceding years.	Average for June, 1885.	Departures.	Mean for June of three preceding years.	Mean for June, 1885.	Departures.	Mean for June of three preceding years.	Mean for June, 1885.	Departures.	Max.	Min.
				°	°	°	°	°	°	°	°
New Orleans	5.09	3.01	— 2.01	90.1	92.9	+ 2.8	70.8	69.4	— 1.4	105	54
Savannah	6.32	4.15	— 2.17	88.9	91.2	+ 2.3	68.9	70.3	+ 1.4	103	59
Charleston	5.35	6.66	+ 1.31	88.4	88.7	+ 0.3	67.1	67.2	+ 0.1	99	48
Atlanta	5.28	3.90	— 1.38	86.6	89.3	+ 2.7	65.4	66.7	+ 1.3	101	51
Wilmington	5.10	4.87	— 0.23	87.7	87.6	— 0.1	65.1	64.2	— 0.9	97	41
Memphis	4.24	4.70	+ 0.46	87.6	89.2	+ 1.6	66.5	67.6	+ 1.1	102	42
Galveston	2.68	.....	.....	92.2	.....	.....	70.2	.....	.....	.....	.....
Vicksburg	3.47	2.38	— 1.09	89.9	92.3	+ 2.4	68.8	68.5	— 0.3	102	45
Montgomery	5.22	3.47	— 1.75	88.7	91.7	+ 3.0	67.6	69.2	+ 1.6	108	57
Augusta	5.22	4.24	— 0.98	88.7	90.3	+ 1.6	66.7	67.0	+ 0.3	103	54
Little Rock	2.78	2.71	— 0.07	89.6	90.1	+ 0.5	65.7	66.3	+ 0.6	100	48
Mobile	4.48	2.69	— 1.79	91.7	92.1	+ 0.4	68.3	74.7	+ 6.4	103	50

WINDS.

The most frequent directions of the wind during June, 1885, are shown on chart ii. by arrows flying with the wind. In the lower lake region, Tennessee, and the upper Ohio valley, the prevailing winds were from southwest and west; in the upper Missouri valley, northern and middle slopes, they were easterly and southeasterly; in the middle Atlantic and Gulf states, upper Mississippi, and the lower portions of the Ohio and Missouri valleys, they were southerly; on the California coast they were westerly, except at Cape Mendocino, where the prevailing direction was north; in other districts they were variable.

HIGH WINDS.

(In miles per hour.)

During the month of June velocities of fifty or more miles per hour were recorded at stations as follows:

On the summit of Mount Washington, New Hampshire, 78, nw., 1st; 63, nw., 2d; 69, nw., 6th; 60, w., 7th; 73, w., 8th; 85, nw., 9th; 69, w., 10th; 60, w., 13th; 100, w., 14th; 98, nw., 15th; 52, w., 16th; 67, nw., 17th; 67, nw., 18th; 50, s., 21st; 79, nw., 22d; 78, nw., 23d; 87, nw., 24th.

Pike's Peak, Colorado, 52, w., 4th; 62, sw., 5th; 78, w., 6th; 56, sw., 11th; 54, s., 13th; 60, w., 20th; 52, se., 21st.

Montrose, Colorado, 50, sw., 5th.

Fort Buford, Dakota, 56, ne., 6–7th.

Dodge City, Kansas, 52, se., 5th.

Fort Custer, Montana, 55, w., 6th.

Fort Maginnis, Montana, 54, n., 6th.

Fort Concho, Texas, 52, e., 30th.

Cheyenne, Wyoming, 50, s., 5th.

LOCAL STORMS AND TORNADOES.

Chicago, Illinois, 2d: between 5 and 6 p. m. a thunder-storm, accompanied by heavy rain, prevailed in this city and vicinity. Many buildings were struck by lightning during the storm. Another violent thunder-storm, with heavy rain, prevailed during the night of the 2–3d. Five persons are reported to have been killed by lightning.

Atchison, Kansas: a violent storm occurred at this place on the 3d. The rainfall was remarkably heavy and resulted in the overflow of all streams in this vicinity. The damage to property is estimated at $60,000.

Paris, Edgar county, Illinois: a very violent storm occurred here at about 7 p. m. on the 4th. Numerous buildings were unroofed, and large numbers of trees and telegraph poles were prostrated. A church was almost entirely demolished.

Olivet, Eaton county, Michigan: a very severe storm, lasting about one hour, began at about 6 p. m. on the 4th. The high wind and very heavy rainfall (about four inches) caused much damage to crops; cellars were flooded and fencing scattered.

Oil City, Pennsylvania: during the night of the 4–5th the heaviest rains experienced for many years fell in this vicinity. The track of the Lake Shore railroad was washed away in several places between this place and Stoneborough; on the Allegheny Valley railroad there were four washouts between Oil City and Franklin.

Pierre, Hughes county, Dakota: a storm of unusual severity occurred at this place at about 5 p. m. on the 5th. It was accompanied by hail and very heavy rain, the latter causing much damage by flooding cellars, while many windows were broken by the hail. At Forest City, Potter county, the storm was also very severe, the hail and heavy rain causing much damage.

Fort Bennett, Dakota: on the 5th a high wind set in at 3.45 p. m., and continued with increasing force until 10.38 p. m. The maximum hourly velocity of the wind, 44 miles, west, occurred about 8 p. m., but at 10.30, a sudden squall occurred, during which, for two or three minutes, the wind blew at the rate of 72 miles per hour. This squall blew down nearly all of the out-buildings and fencing at the post and Indian agency. The rainfall during the storm amounted to 1.58 inches, which is an unusually large amount for this place. The Missouri river rose six feet during the night of the 5–6th, and small streams in the vicinity overflowed.

Baltimore, Maryland: during the afternoon of the 5th a severe storm, lasting about twenty minutes, prevailed in this city. It began at about 2.45 p. m., and was confined to an area less than one mile in width and about five miles in length through the northeastern part of the city. In the central part of the city but slight damage was caused, but in the northern and eastern sections many buildings were unroofed or otherwise damaged. At Higlandtown, five miles east of the city, many dwellings were wrecked and one man was killed.

Chincoteague, Virginia: during the afternoon of the 5th a thunder-storm occurred at this place, and at 5.30 p. m. (after the thunder-storm) the wind suddenly increased from a velocity of twelve to forty miles per hour, and continued at that rate for fifteen minutes.

Richmond, Virginia: a severe storm passed over this city on the afternoon of the 5th. A number of houses were unroofed and trees were blown down. Reports from Petersburg state that the storm was unusually severe at that place and resulted in considerable damage.

Owatonna, Steele county, Minnesota: a severe wind and hail storm passed over this place on the 7th. The hail-stones, which were about the size of hens' eggs, fell in sufficient quantity to cover the ground. Trees and crops were badly damaged, and nearly all the sky-lights in the town were broken. The storm lasted about half an hour.

Utica, New York: at about 8.30 p. m. on the 7th a violent wind and hail storm prevailed in this vicinity. At 1.20 a. m. of the 8th another very severe storm passed over the city, moving from west to east. During the latter storm, which lasted about thirty minutes, buildings were unroofed and many light structures were demolished.

Woodstock, Shenandoah county, Virginia: at 6.45 p. m. on the 7th a violent wind and rain storm occurred at this place. The streets were flooded, buildings unroofed, and trees and fencing blown down. The damage at this place is estimated at $10,000.

Dubuque, Iowa: during the night of the 7–8th a heavy rain and hail storm passed over this place; it moved in an easterly direction and lasted about thirty minutes. Several dwellings and about twenty barns were wrecked.

Peoria, Illinois: a violent storm is reported to have passed over Marshall county, in this state, during the night of the 7–8th, unroofing houses and blowing down trees, etc.

Deadwood, Dakota: at 2.28 p. m. on the 11th a tornado-cloud formed a short distance east of this station. It passed to the south of "White Rocks," over the divide, and into Spruce Gulch. The tornado was accompained by a heavy fall of hail, the hail-stones measuring from one-fourth to two and one-half inches in diameter. After passing into Spruce Gulch the storm became more violent and levelled all trees in its path; a few buildings were blown down.

Council Bluffs, Iowa: a severe storm occurred here at 8 p. m. on the 12th. The Deaf and Dumb Asylum was unroofed and the building damaged to the extent of $10,000.

Minneota, Lyon county, Minnesota: the storm which occurred in this vicinity on the 12th is reported to have passed through the following townships in Yellow Medicine county: Wergeland, Burton, Swede, Prairie, Normania, and Sannes; it also passed through the northern part of Westerheim valley and the town of Lucus, in Lyon county. Hail fell over a large part of the area visited by the storm, causing great damage to the growing crops. At Lucus about seven hundred acres of wheat were totally ruined. The losses sustained are estimated at more than $100,000.

Sioux City, Iowa: during the night of the 12–13th a passenger train on the Sioux Falls Branch of the Chicago, Milwaukee, and Saint Paul railway was blown from the track by a tornado, and a number of persons were injured. During the night of the 14–15th a severe wind storm occurred at Sioux City, causing damage estimated at about $10,000.

Pulaski, Davis county, Iowa: a tornado occurred here during the night of the 12–13th. The storm approached from the northwest and lasted about twenty minutes, destroying and unroofing buildings. Four persons are reported to have been killed.

Lexington, Missouri: during the night of the 13–14th this place was visited by a very heavy rain storm, which caused damage estimated at $2,000.

The following is an extract from the New York "Journal of Commerce," of June 15, 1885:

SAN ANTONIO, TEXAS, *June* 14.—Information has been received here to-day from Salinas, Mexico, to the effect that a terrific cyclone recently visited that section, doing great damage to crops. About forty-five houses in the immediate track of the cyclone were demolished, leaving many families entirely destitute.

Omaha, Nebraska: a severe wind and hail storm occurred in this vicinity on the 14th, causing damage to barns and other buildings. Dispatches from points along the Union Pacific railroad report the occurrence of severe storms on this date. At Millard, twenty miles west of Omaha, considerable damage was done.

Stillwater, Minnesota: a severe wind and rain storm occurred about midnight of the 14–15th, causing damage estimated at $20,000.

Dayton, Ohio: a destructive storm occurred in this vicinity during the evening of the 15th. Dwellings and other buildings in Middletown, Carlisle, Germantown, Miamisburg, and Carrollton were unroofed or otherwise damaged, and the bridge over the river at Miamisburg was partially wrecked.

Augusta, Georgia: considerable damage, such as blowing down trees, etc., was done in this vicinity by the storm on the afternoon of the 16th.

Beloit, Rock county, Wisconsin: during the early morning of the 16th a tornado occurred ten miles northwest of this place; no serious damage was done.

Idaho City, Idaho: a severe storm occurred at this place at about 3 p. m. on the 19th; several buildings were damaged; the storm was of from fifteen to twenty minutes duration.

Boisé City, Idaho: between 5 and 6 p. m. on the 19th a thunder-storm prevailed, during which the wind reached a velocity of 30 miles per hour; a light fall of hail accompanied the storm; many trees in this vicinity were blown down. At points to the northeast and southeast hail is reported to have fallen to a depth of four inches.

Brownsville, Saline county, Missouri: reports state that a tornado occurred about five miles east of this place during the evening of the 20th. Several buildings and much fencing were demolished.

Breckenridge, Caldwell county, Missouri: at 11.15 p. m. on the 20th a tornado demolished several dwellings and blew down many trees at this place. The storm lasted about thirty minutes and is considered the severest ever experienced here.

Macon City, Macon county, Missouri: a tornado occurred two miles south of this place during the night of the 20–21st, causing much damage. Several buildings were destroyed and many trees prostrated.

Chillicothe, Livingston county, Missouri: the storm during the night of the 20–21st caused damage at this place to the extent of from $15,000 to $20,000.

Centralia, Boone county, Missouri: from 2.15 to 4 a. m. on the 21st a violent storm prevailed at this place. About fifty out-buildings in this vicinity were blown down, together with a large number of trees and much fencing.

Saint Clairsville, Belmont county, Ohio: a destructive storm passed over a strip of country about one mile wide by five miles in length, near Hendrysburg, in this county, during the evening of the 22d. The course of the storm was from southwest to northeast, and buildings, trees, and crops within its path were destroyed. In some instances trees two feet in diameter were broken off close to the ground and carried long distances. This storm is considered the severest ever before experienced in this vicinity.

Penn Yan, Yates county, New York: nearly four inches of rain fell in less than two hours on the morning of the 23d. This was one of the most sudden and violent rain storms ever experienced here, and resulted in much damage to buildings, fences, and crops.

Galveston, Texas: a very violent thunder-storm prevailed here during the early morning of the 24th; it moved from west to east, and was most severe between 2 and 3 a. m. Several buildings were struck by lightning during the storm.

Memphis, Tennessee: light sprinkles of rain fell at intervals during the afternoon of the 25th, but the amount was inappreciable at this station, while between 5.30 and 6 p. m. a remarkably heavy fall of rain (more than two inches) occurred about two and one-fourth miles east of the city.

Pipe Stone, Pipe Stone county, Minnesota: a severe storm of rain and hail occurred during the early morning the 26th. In this vicinity and in the surrounding country much damage was done to crops and buildings.

Baltimore, Maryland: between 2.50 and 10.15 a. m. on the 28th the heaviest rainfall occurred that has been recorded since the establishment of the signal office in this city. About four and one-half inches of rain fell during the storm, causing great damage in that part of the city bordering on Jones' Falls. Several streets were inundated to a depth of four feet.

The following are reports of tornadoes for June, 1885, made by special tornado observers, of whom there are more than 1,300:

2d.—A tornado occurred five miles south of Graham, Nodaway county, Missouri, at 7 p. m. The cloud was funnel shaped. But little damage was done.

3d.—A tornado occurred fifteen miles west of Graham, Nodaway county, Missouri, at 6.45 p. m. There were two funnel-shaped clouds moving eastward, in parallel tracks, about three miles apart. The length of the path was forty miles. In the southern track eight persons were injured, and nine houses and one school house destroyed.

5th.—A tornado occurred at Summer Hill, Douglas county, Nebraska, at 7 p. m. The cloud was balloon shaped. The track was nine hundred feet wide. No persons were injured. One brick dwelling, a large frame dwelling, a windmill, several stables and out-buildings were destroyed.

7th.—A tornado occurred at New Albion, Allamakee county,

Iowa, at 1 p. m., moving E. 20° S. Four persons were injured. A railroad elevator, school house, seven residences, and several barns were totally destroyed, and twenty houses unroofed. The damage is estimated at $50,000.

7th.—A tornado occurred at Junction City, Boyle county Kentucky, at 3 p. m., moving in a northeasterly direction. The cloud was funnel shaped. The path was 2,400 feet wide. No persons were killed. Some houses and out-buildings were destroyed.

12th.—A tornado occurred six miles south of Sargent, Custer county, Nebraska. Three persons and two horses were killed by lightning. Several houses were destroyed.

12th.—A tornado occurred at Wessington Springs, Jerauld county, Dakota. A small funnel-shaped cloud formed a little north of west of the town at 5.25 p. m., and moved in a southwesterly direction; no damage was done.

12th.—A number of small tornadoes occurred at various places in the state of Iowa:

At Bridgewater, Cass county, two persons were fatally, and several slightly, injured. Five dwellings, a broom factory, and a drug store were destroyed, and a large number of houses damaged; losses estimated at $60,000.

In the southeastern part of Davis county three persons were killed and four injured, and two houses destroyed.

In Lakeport township, Woodbury county, about $1,000 worth of timber was destroyed.

At Sloan, Woodbury county, the tornado occurred at 7.30 p. m.; fifteen persons were injured; three dwellings and some out-buildings destroyed.

Near Sully, Jasper county, the cloud appeared at 3 p. m., was funnel shaped and moved eastward; four persons were injured, two horses killed, one dwelling, one stable, and two barns destroyed.

A funnel-shaped cloud was observed nine miles northwest of Sioux City, Woodbury county, at 6.48 p. m.; twenty persons were injured. A passenger train was struck by the cloud, and three coaches and baggage car thrown from the track and badly damaged.

19th.—A tornado occurred at Cleveland, Kingman county, Kansas, at 1 a. m., moving southeast. The cloud was funnel shaped. One person badly, and several slightly, injured. Nine dwellings and two stables entirely destroyed and much damage to other property.

20th.—A tornado occurred at Seward, Stafford county, Kansas, in the afternoon, moving southeast. The cloud was funnel shaped. The path was 3,960 feet in width and twelve miles in length. Two horses and several head of cattle were killed. Eight persons were injured. Eight dwellings, two stables, and some out-buildings destroyed.

20th.—A tornado occurred at Sibley, Jackson county, Missouri, at 10 p. m., moving northeast. It is reported to have whirled contrary to the hands of a watch. The path was 1,200 feet wide. A large store was destroyed.

20th.—A tornado occurred near Leavenworth, Kansas, at night. Five persons were injured in one house; three horses killed and nine injured; one barn was blown to pieces; one dwelling was destroyed and the occupants thown about in all directions; the second story was blown from another dwelling.

21st.—A tornado occurred at Ravenna, Portage county, Ohio, at 7.45 p. m., passing N. 25° E. The cloud was funnel shaped, whirled contrary to the hands of a watch, and was about one minute in passing a place. The path was five hundred feet wide and four miles long; two persons were injured. Four barns and one dwelling destroyed, and fifteen business blocks unroofed. Damage amounted to $50,000.

21st.—A tornado occurred at Glasgow, Howard county, Missouri, at fifteen minutes past midnight. The cloud was funnel shaped; five buildings were destroyed and twelve unroofed; one man was killed and another seriously injured.

22d.—A tornado occurred at Friendship, Allegheny county, New York at 2.20 a. m., moving northeast. The cloud was funnel shaped and whirled contrary to the hands of a watch. The path was five hundred feet wide; some buildings were unroofed and barns blown down.

27th.—A tornado occurred seven miles north of Nebraska City, Nebraska, at 1.40 p. m., moving northeast. The cloud was "serpent" shaped.

NAVIGATION.

STAGE OF WATER IN RIVERS.

In the following table are shown the danger-points at the various river stations; the highest and lowest stages for June, 1885, with dates of occurrence, and the monthly ranges:

Heights of rivers above low-water mark, June, 1885.

[*Expressed in feet and tenths.*]

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
Red river:						
Shreveport, Louisiana	29 9	1, 2	22 2	25	16 5	5 7
Arkansas river:						
Fort Smith, Arkansas	15 0	26, 28	17 1	10	7 3	9 8
Little Rock, Arkansas	23 0	29	17 5	13	9 0	8 5
Missouri river:						
Yankton, Dakota	24 0	15	20 5	6	12 9	7 6
Omaha, Nebraska	18 0	17	16 6	3	9 4	7 2
Leavenworth, Kansas	20 0	19	17 9	1, 4	12 3	5 6
Mississippi river:						
Saint Paul, Minnesota	14 5	18, 19	7 4	12	4 4	3 0
La Crosse, Wisconsin	24 0	26, 27, 28	9 1	12, 14	6 4	2 7
Dubuque, Iowa	16 0	1	10 2	19	6 9	3 3
Davenport, Iowa	15 0	1, 2, 3, 6, 7	7 8	23, 24, 25	5 4	2 4
Keokuk, Iowa	14 0	13	12 3	30	7 0	5 3
Saint Louis, Missouri	32 0	17	27 0	4	18 8	8 2
Cairo, Illinois†	40 0	22	30 8	15	25 5	5 3
Memphis, Tennessee	34 0	23 to 27	23 4	1	14 8	8 6
Vicksburg, Mississippi	41 0	31	33 1	5	27 2	5 9
New Orleans, Louisiana*	—3 0	1	— 4 2	25, 26	— 5 3	1 1
Ohio river:						
Pittsburg, Pennsylvania	22 0	6	9 9	30	1 6	8 3
Cincinnati, Ohio	50 0	2	22 5	24	9 3	13 2
Louisville, Kentucky	25 0	2 to 5	9 2	25, 26	5 5	3 7
Cumberland river:						
Nashville, Tennessee	40 0	3	27.8	29	3 3	24 5
Tennessee river:						
Chattanooga, Tennessee	33 0	1	18 6	27	3 4	15 2
Monongahela river:						
Pittsburg, Pennsylvania	29 0	6	9 9	30	1 6	8 3
Savannah river:						
Augusta, Georgia	32 0	11	14 8	24	6 4	8 4
Mobile river:						
Mobile, Alabama	.....	5	18 5	22	15 4	3 1
Sacramento river:						
Red Bluff, California	.....	10 to 19	1 0	1 to 5	0 8	0 2
Sacramento, California	.....	1, 2, 3	11 0	29, 30	9 0	2 0
Willamette river:						
Portland, Oregon	.....	23, 24	14 5	1	11 7	2 8
Colorado river:						
Yuma, Arizona	.....	13	24 8	24	21 5	3 3

* Below high-water mark of 1874 and 1883. † Record for last 25 days of the month.

HIGH TIDES.

New London, Connecticut, 7th: the tide rose to a height of two feet above the normal high tide, and flooded cellars.

Eastport, Maine, 15th.

Smithville, North Carolina, 14th.

FLOODS.

Petersburg, Virginia: on the 2d reports from the surrounding counties stated that in consequence of the recent heavy rains all streams were much swollen, and that a number of small bridges were washed away. The river at Petersburg reached the highest point known for a long time, and the recently-built city reservoir overflowed.

Pittsburg, Pennsylvania: between 8 and 10 p. m. on the 4th a remarkably heavy rainfall occurred in the northeastern part of Allegheny City, and at Wood's Run. At the latter place the rainfall is estimated at not less than ten inches. This very heavy fall of rain caused a rise of seven feet in the Allegheny river at Wood's Run in about fifteen minutes, and resulted in flooding the cellars of many buildings; in some instances the floors of the first stories were covered. A number of calves, sheep and hogs were drowned.

Cleveland, Ohio: the heavy rain on the 4th caused numerous washouts in this city. The Cleveland and Pittsburg railroad track near Woodlawn avenue was washed out for a distance of one hundred and fifty feet.

New River Inlet, North Carolina: the crops in this vicinity were badly damaged by the heavy rainfall on the 9th.

The following is an extract from the "New York Herald," of June 11th:

CITY OF MEXICO, *via* GALVESTON, *June* 10, 1885.—Details of the terrible loss of life and destruction of property by the remarkable water-spouts near Lagos, in the state of Jalisco, and at Guanajuato, are still very meagre. All the dispatches thus far received estimate the loss of life in the Lagos district at over two hundred souls. The damage by the flood in the city of Guanajuato is now placed at $300,000.

The "New York Journal of Commerce," of June 15th, contained the following:

CITY OF MEXICO, *via* GALVESTON, *June* 13.—Advices from Leon state that on the night of June 7th the Leon river rose and entered the eastern part of the city. Two persons were drowned, the Central railway track was washed out and the growing crops west of Leon were destroyed. The loss to property was small.

On the following night a tremendous water-spout broke a few miles above the town of Pason de Cuarenta, situated twenty miles from Lagos City. The flood was great and sudden, and practically annihilated Cuarenta. Thus far one hundred and seventy bodies have been recovered. Many bodies were washed several miles down the valley and are being discovered in the fields below the town. The search is now going on. Pason de Cuarenta had about eight hundred inhabitants before the flood.

Wilmington, North Carolina: the heavy rainfall during the night of the 9–10th flooded many basements and cellars in this city. The overflowing of a creek about one mile from the city caused a large washout on the New Berne road.

Fort Shaw, Montana: on the 13th Sun river rose rapidly; it continued to rise on the 14th, and on that date the town of Sun River, a few miles east of Fort Shaw, was flooded. Owing to the overflowed condition of the surrounding country travel was much impeded. On the 16th the first stage from Helena since the 12th arrived, and the driver reported that the roads were badly flooded and that many bridges had been washed away.

Keokuk, Iowa: from 2.10 to 3.10 p. m. on the 13th, more than two inches of rain fell. This was followed by a rise of ten feet in the Des Moines river. The town of Alexandria, Missouri, was flooded; also, an area of lowland about six miles in length by three miles in width.

Macon City, Macon county, Missouri: reports from the southern part of this county state that the heavy rainfall on the 19th resulted in the overflow of a large area of low lands, and at Bevier about two hundred feet of the Hannibal and Saint Joe railroad track were washed out.

Carlinville, Macoupin county, Illinois: the very heavy rains during the night of the 19–20th resulted in flooding the lowlands in this vicinity.

Saint Louis, Missouri, 21st: the very heavy rainfall of the night of the 19–20th caused a large amount of damage to growing crops, farm-houses and railroad embankments throughout "American Bottom," in Saint Clair and Madison counties, Illinois. Many villages were inundated and live stock in large numbers were drowned. At Collinsville, Madison county, and in that vicinity, a considerable territory was inundated and a number of dwellings and business houses were submerged to a more or less extent. At Belleville, Saint Clair county, the overflow of Richland creek caused a large amount of damage. More than one hundred families living along the creek had their dwellings flooded, and in some instances persons narrowly escaped drowning.

Pinckneyville, Perry county, Illinois: the heaviest fall of rain known for many years occurred during the early morning of the 20th, causing great damage to the growing crops; bridges and fencing throughout the county were washed away and considerable live stock drowned.

Jefferson City, Missouri: portions of the Callaway bottoms, opposite this city, were inundated on the 20th.

Duquoin, Perry county, Illinois: during the early morning of the 20th a remarkably heavy fall of rain occurred at this place, causing great damage to bridges and other property; the first floors of several dwellings were submerged.

Erie, Pennsylvania: the heavy rainfall (3.61 inches) which accompanied the storm during the night of the 21–22d, caused great damage by flooding cellars and washing out the sidewalks and streets. At the water-works an extensive landslide occurred, which damaged the machinery to the extent of $2,000. The streams in the surrounding country overflowed and great damage was done to the crops.

Buffalo, New York: during the night of the 21–22d 3.28 inches of rain fell in five hours and thirty-five minutes. A large part of the northern section of the city was flooded and many families were compelled to leave their homes.

Chattanooga, Tennessee: a very heavy rainfall occurred between 2 and 5.15 a. m. on the 25th, about two inches having fallen in two hours and thirty minutes. The streets and sewers in this city were flooded and the roadways in the vicinity were badly washed.

Milwaukee, Wisconsin: a very heavy rainfall occurred from 7.30 to 8.45 p. m. on the 26th; a large number of washouts are reported from points along the railroads entering the city; considerable damage was done in this city by the flooding of cellars, etc.

Canajoharie, Montgomery county, New York: the very heavy rainfall on the afternoon of the 28th caused considerable damage in this vicinity by washing away fencing, etc. At Sharon Springs, Schoharie county, the hop yards and fields of corn and wheat were entirely ruined.

Lyons, Wayne county, New York: the rainfall during the evening of the 28th is considered the heaviest that has occurred here for many years. In a few minutes the streets in the village were flooded and all streams in the vicinity overflowed.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for June, 1885, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentage of verifications to be 87.69 per cent. The percentages for the four elements are: Weather, 88.06; direction of the wind, 88.51; temperature, 85.39; barometer, 90.98 per cent. By geographical districts, they are: For New England, 83.75; middle Atlantic states, 90.90; south Atlantic states, 85.81; eastern Gulf states, 88.22; western Gulf states, 87.59; lower lake region, 87.70; upper lake region, 85.83; Ohio valley and Tennessee, 87.00; upper Mississippi valley, 87.26; Missouri valley, 88.78; north Pacific coast region, 85.27; middle Pacific coast region, 89.29; south Pacific coast region, 94.35. There were two omissions to predict out of 3,567, or 0.06 per cent. Of the 3,565 predictions that have been made, sixty-three, or 1.77 per cent., are considered to have entirely failed; sixty-seven, or 1.88 per cent., were one-fourth verified; three hundred and fifty-three, or 9.90 per cent., were one-half verified; five hundred and ninety-six or 16.72 per cent., were three-fourths verified; 2,486, or 69.73 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

CAUTIONARY SIGNALS.

During June, 1885, one hundred and thirty-five cautionary signals were ordered. Of these, one hundred and nineteen, or 88.15 per cent., were justified by winds of twenty-five miles or more per hour, at or within one hundred miles of the station. Sixty-two cautionary off-shore signals were ordered, of which number, forty-four, or 70.97 per cent., were fully justified both as to direction and velocity; forty-eight, or 77.42 per cent., were justified as to direction; and fifty-two, or 83.87 per cent., were justified as to velocity. One hundred and ninety-seven signals of all kinds were ordered, one hundred and sixty-three, or 82.74 per cent., being fully justified. These do not include signals ordered at display stations where the velocity of the wind is only estimated. Of the above cautionary off-shore signals, twenty-six were changed from cautionary. Five signals were ordered late. In fifty-nine cases winds of twenty-five miles or more per hour were reported for which no signals were ordered.

Table of miscellaneous meteorological data for June, 1885—Signal Service observations.

Stations.	Elevation above sea-level.	Atmospheric pressure: Mean actual barometer.	Departure from normal.	Mean reduced barometer.	Extremes: Highest barometer	Date.	Lowest barometer	Date.	Monthly range of barometer.	Temperature of the air: Monthly mean.	Departure from normal.	Extremes: Max.	Date.	Mean max	Min.	Date.	Mean min	Monthly range.	Daily ranges: Greatest.	Date.	Least.	Date.	Mean rel. humidity.	Mean dew-point.	Precipitation.	Departure from normal	Winds: Total movement.	Prevailing direction.	Max. velocity: Miles p.hr	Direction.	Date.	No. of rainy days.	No. of cloudy days.	No. of fair days.	No. of clear days.
New England.																																			
Eastport	61	29.81	—.03	29.88	30.20	11	29.32	8	0.88	56.1	+0.8	81.6	25	63.7	39.3	2	48.0	42.3	26.7	15	7.3	2	74.1	47.1	4.64	+0.54	5,792	s.	35	e.	30	7	8	16	6
Portland	45	29.85	—.03	29.89	30.22	11	29.31	8	0.88	65.3	+1.0	90.1	16	75.4	46.8	10	56.4	43.3	30.9	10	9.8	29	67.6	53.5	4.06	+0.58	5,630	s.	30	s.	29	7	5	13	12
Mount Washington	6,279	23.78	—.04	29.90	30.23	19	29.40	8	0.82	42.0	—1.3	63.2	13	50.5	15.5	9	36.2	47.7	24.3	8	7.5	4	87.5	38.8	11.34	+1.89	25,025	nw.	100	w.	14	15	6	16	8
Boston	122	29.81	—.01	29.94	30.26	11	29.43	8	0.82	66.4	+0.2	91.9	16	77.2	45.3	5	56.2	46.6	28.0	10	8.5	1	62.0	51.6	3.70	+0.05	8,939	w.	34	e.	5	7	4	11	15
Point Judith	...	...	...	...	...	...	...	...	...	61.3	...	75.0	29	67.9	44.0	7	54.8	31.0	...	...	...	...	...	...	4.93	—1.72	...	...	...	...	...	6	...	...	...
Block Island	27	29.95	...	29.97	30.30	11	29.43	5	0.80	62.7	+0.3	77.4	15	69.6	48.0	6	56.3	29.4	19.3	18	5.3	28	81.6	56.7	1.90	—3.08	10,061	sw.	42	ne.	5	8	5	11	14
Narragansett Pier	...	...	...	...	...	...	...	...	...	64.0	...	83.0	16	73.7	43.0	6	54.3	40.0	...	...	...	...	...	...	1.58	—1.35	...	...	...	...	...	6	...	...	...
New London	47	29.95	—.01	29.99	30.30	11	29.49	8	0.81	65.4	—0.3	83.3	8	73.6	46.5	10	56.0	36.8	20.9	6	8.0	17	90.9	55.0	2.12	—1.45	4,832	sw.	23	s.	28	6	2	10	18
New Haven	107	29.87	+.02	29.97	30.27	11	29.45	5	0.82	65.2	—2.5	89.3	16	75.8	44.7	10	55.0	44.6	30.3	14	9.0	28	67.8	53.2	1.43	—1.93	4,725	sw.	29	ne.	5	7	1	14	15
Middle Atlantic states.																																			
Albany	75	29.89	+.02	29.97	30.28	11	29.47	5	0.81	67.1	—1.5	89.8	16	77.9	46.2	6	56.4	43.6	30.9	25	10.6	30	61.6	52.1	1.98	—2.10	5,856	nw.	26	s.	21	9	2	12	16
New York City	164	29.83	+.02	29.99	30.28	10	29.44	5	0.84	67.3	—1.4	90.6	16	78.0	51.5	9	59.0	39.1	27.0	16	7.4	28	69.1	56.1	1.86	—1.52	7,048	s.	37	nw.	9	7	3	15	12
Sandy Hook	28	29.98	+.03	30.00	30.35	11	29.43	5	0.87	67.1	—1.6	90.4	16	77.6	53.3	9	59.4	37.1	29.7	16	7.5	28	67.8	55.3	1.41	—2.95	10,456	se.	48	ne.	5	5	3	13	14
Barnegat City	22	29.99	+.04	30.00	30.30	10	29.44	5	0.85	66.3	—0.3	89.6	16	74.5	52.9	6	58.6	36.7	30.3	5	8.3	28	78.7	59.1	0.72	—3.05	8,553	s.	40	ne.	5	8	3	12	15
Little Egg Harbor	...	...	...	...	...	...	...	...	...	66.7	...	88.7	14	74.7	51.2	9	58.6	37.5	...	...	...	...	...	...	1.65	—0.16	...	...	...	...	...	4	...	...	...
Atlantic City	13	29.99	+.03	29.99	30.31	10	29.46	5	0.84	66.7	—0.1	87.3	22	74.8	52.0	10	59.3	35.3	23.8	29	5.0	28	84.2	61.4	1.33	—2.01	5,848	s.	33	ne.	5	7	4	12	14
Cape May	27	29.98	+.04	29.99	30.25	10	29.48	5	0.78	67.6	—0.7	85.2	15	74.7	58.0	4	61.6	27.2	24.0	23	7.0	21	80.1	60.8	22.3	—1.38	9,429	s.	48	sw.	5	7	3	14	13
Philadelphia	117	29.99	+.02	30.00	30.29	10	29.48	5	0.82	70.6	—0.7	93.0	16	80.7	51.7	9	61.4	41.3	27.8	5	11.5	28	60.5	54.8	0.74	—2.84	7,380	s.	34	n.	30	6	3	15	12
Baltimore	45	29.98	+.03	30.01	30.30	10	29.52	5	0.77	72.6	—1.4	95.3	14	82.3	55.7	9	64.3	39.6	27.2	14	5.0	25	61.0	57.4	6.31	+2.47	4,354	nw.	21	nw.	8	8	5	15	10
Washington City	106	29.94	+.06	30.04	30.31	10	29.53	5	0.78	71.1	—2.5	95.1	16	80.8	51.8	10	61.8	43.3	26.7	16	6.4	27	66.0	57.8	3.30	—1.12	3,994	s.	21	n.	5	7	4	13	13
Cape Henlopen	...	...	...	...	...	...	...	...	...	68.6	...	93.2	16	77.4	52.5	9	59.8	40.7	...	...	...	...	...	...	1.38	...	...	...	...	...	...	5	...	...	...
Chincoteague	8	30.02	+.04	30.01	30.29	10	29.54	8	0.75	69.4	—0.1	89.8	15	77.6	52.4	7	61.7	37.4	23.4	14	8.5	17	78.6	61.5	1.82	—0.65	6,152	se.	39	s.	5	6	6	11	13
Cape Henry	16	30.03	+.05	30.03	30.30	24	29.60	5	0.70	72.2	—1.2	94.0	15	80.5	57.1	7	65.0	36.9	23.7	4	7.0	25	75.0	63.3	2.20	—1.50	8,207	sw.	44	sw.	6	5	6	10	14
Norfolk	30	30.01	+.04	30.02	30.26	24	29.64	5	0.61	74.3	—1.2	96.9	15	83.2	55.8	6	65.8	41.1	31.4	7	9.6	23	72.5	64.1	3.48	—0.83	5,024	sw.	24	nw.	5	8	7	13	10
Lynchburg	652	29.36	+.05	30.02	30.28	24	29.63	5	0.65	73.3	—1.2	93.1	15	82.9	52.5	11	63.9	40.6	26.8	2	6.2	24	68.5	61.3	3.30	—0.16	2,423	s.	20	w.	5	11	7	14	9
South Atlantic states.																																			
Kitty Hawk	22	30.06	+.01	30.05	30.30	24	29.66	5	0.63	72.4	—0.7	96.5	15	81.1	56.1	6	66.6	40.4	26.6	8	4.9	18	81.1	65.9	3.81	—0.92	8,947	ne.	37	nw.	5	10	9	13	8
Hatteras	12	30.05	+.05	30.04	30.26	24	29.71	5	0.55	73.0	—1.2	86.7	29	78.3	59.0	20	67.6	27.7	17.7	29	6.4	23	82.3	66.9	4.42	—0.31	7,018	ne.	38	n.	8	12	5	11	14
Fort Macon	11	30.06	+.05	30.04	30.24	19	29.72	5	0.52	74.4	—0.6	85.8	29	79.1	63.1	11	69.6	22.7	16.0	7	4.5	10	86.5	69.9	5.81	+0.37	9,866	sw.	48	nw.	8	10	6	14	10
New River Inlet	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wilmington	52	30.01	+.05	30.04	30.23	19	29.76	5	0.47	76.4	—0.2	93.0	29	84.4	58.2	10	68.5	40.2	21.8	21	8.9	6	76.3	67.6	8.21	+2.14	4,630	sw.	21	w.	8	7	6	19	5
Smithville	34	30.03	+.04	30.04	30.24	19	29.77	5	0.47	76.4	—0.4	92.0	29	82.8	59.0	12	68.8	33.0	24.2	21	5.8	18	81.1	69.9	2.35	—1.03	7,795	sw.	27	ne.	10	10	6	15	9
Charlotte	808	29.23	+.06	30.03	30.27	19	29.73	5	0.54	75.6	—0.3	90.2	5	84.3	53.2	11	67.3	37.0	24.3	11	9.0	9	68.3	63.7	3.48	—0.73	3,231	sw.	21	nw.	8	11	7	13	10
Atlanta	1,129	28.92	+.04	30.05	30.23	19	29.83	5	0.40	76.4	+1.0	90.2	6	84.0	56.6	11	69.2	33.6	19.5	3	10.2	8	70.9	65.4	4.83	+0.57	4,922	nw.	27	w.	16	9	5	14	11
Augusta	183	29.90	+.05	30.05	30.25	19	29.78	5	0.47	77.8	—1.0	99.0	6	91.0	58.0	11	68.5	41.0	30.6	2	7.5	10	72.2	66.6	2.80	—1.35	2,216	s.	20	sw.	16	11	4	18	8
Charleston	52	30.02	+.05	30.04	30.22	19	29.82	5	0.40	79.5	0.0	96.4	29	86.8	64.0	11	73.3	32.4	23.4	29	8.1	18	77.0	71.2	5.96	+0.06	5,028	sw.	24	e.	6	12	10	16	4
Savannah	87	29.98	+.04	30.04	30.22	19	29.84	5	0.38	79.7	—0.3	95.0	28	86.7	64.0	11	72.4	31.0	20.5	21	4.5	7	75.2	70.4	8.11	+1.19	4,357	s.	19	e.	9	17	4	17	9
Jacksonville	43	30.01	+.02	30.03	30.17	16	29.84	30	0.33	80.1	—0.5	95.8	29	88.4	67.8	3	73.7	28.0	20.2	10	8.8	17	81.1	73.4	8.98	+3.48	3,900	sw.	24	sw.	8	17	10	16	4
Wash Woods	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Scott's Hill	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cape Lookout	...	...	...	...	...	...	...	...	...	73.8	...	87.0	29	81.3	58.9	19	66.3	28.1	...	...	...	...	...	...	5.09	—0.41	...	...	...	...	...	17	...	...	...
Portsmouth	...	...	...	...	...	...	...	...	...	73.9	...	87.8	29	78.8	62.3	10	69.0	25.5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Florida peninsula.																																			
Sanford	50	30.05	...	30.08	30.23	15	29.90	5	0.33	78.4	—0.2	96.5	29	89.7	68.0	19	72.3	28.5	22.8	23	11.8	15	84.7	73.1	5.89	—3.18	2,783	s.	26	ne.	12	17	4	16	10
Cedar Keys	22	30.02	.00	30.00	30.14	16	29.82	6	0.33	81.4	+0.7	91.8	28	87.5	69.8	10	76.1	22.0	16.4	3	7.3	29	78.1	73.3	10.98	+4.83	4,585	w.	29	se.	15	15	6	20	4
Key West	20	30.05	+.03	30.02	30.15	24	29.79	5	0.30	82.6	—0.6	93.2	28	88.4	72.3	3	77.6	20.9	14.0	23	4.0	2	76.6	74.2	3.58	—0.51	5,622	se.	24	s.	2	9	5	20	5
Eastern Gulf states.																																			
Montgomery	219	29.83	+.04	30.02	30.17	11	29.80	5	0.37	79.8	+0.4	95.2	29	90.6	63.0	1	70.3	32.2	25.1	3	11.3	9	71.9	68.8	4.32	—0.46	2,914	ne.	23	nw.	16	9	1	21	8
Pensacola	30	30.02	+.03	30.01	30.15	25	29.79	5	0.30	80.5	+0.8	93.1	3	88.7	67.1	1	74.2	26.0	23.9	3	7.4	9	70.1	71.8	3.98	—1.65	4,326	s.	21	n.	29	13	3	13	14
Mobile	35	30.02	+.06	30.02	30.15	25	29.79	5	0.36	78.8	—1.9	93.4	29	88.2	63.3	1	71.0	30.1	23.1	2	11.5	8	77.2	70.2	4.18	—1.44	3,003	se.	32	se.	14	12	1	23	6
Vicksburg	252	29.83	+.02	30.02	30.16	25	29.78	5	0.38	80.8	+0.9	96.2	6	91.6	60.9	25	70.5	35.3	30.1	25	15.5	16	68.0	68.3	2.90	—0.90	...	sw.	...	...	...	9	4	16	10
New Orleans	52	29.99	+.04	30.01	30.15	25	29.81	5	0.34	82.2	+1.2	91.7	13	89.1	71.6	1	76.8	20.1	14.8	2	15.8	8	72.4	71.8	3.30	—2.92	3,467	se.	21	s.	12	12	0	20	10
Western Gulf states.																																			
Fort Smith	470	29.51	+.04	29.97	30.16	30	29.72	5	0.45	75.5	—1.3	92.8	20	86.1	61.2	1	67.9	31.6	25.8	7	8.7	22	84.2	69.9	4.88	+2.00	2,798	s.	22	n.	10	15	11	11	8
Little Rock	298	29.69	+.03	29.96	30.12	18	29.72	5	0.39	78.9	+1.9	95.0	7	89.1	66.3	1	71.8	28.7	24.2	1	10.0	24	76.1	70.0	3.39	+0.11	2,401	s.	22	nw.	16	16	6	15	9
Shreveport	227	29.80	+.04	30.00	30.15	25	29.79	5	0.30	81.1	+0.5	97.8	20	93.6	65.7	1	71.5	32.1	27.7	10	15.7	28	71.6	69.8	5.79	+2.57	3,191	s.	29	se.	10	8	2	20	8
Palestine	533	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Indianola	26	29.99	+.05	29.98	30.11	25	29.77	6	0.34	82.2	+0.2	94.9	21	90.8	71.9	5	76.8	23.0	17.1	5	11.0	11	76.9	73.8	0.21	—2.53	7,054	se.	28	s.	25	3	0	18	12
Galveston	40	30.01	+.07	30.01	30.15	25	29.84	6	0.32	84.1	+1.6	92.0	21	88.8	73.4	2	79.1	18.6	14.1	24	7.0	25	71.0	73.4	3.28	—0.98	5,733	s.	24	sw.	24	5	0	15	15
San Antonio	...	29.17	...	29.92	30.03	26	29.74	5	0.29	79.9	—2.3	95.1	24	91.4	59.8	1	71.1	35.3	27.0	1	17.5	12	72.2	69.1	0.86	—1.28	5,673	se.	30	se.	24	3	1	21	8
Rio Grande valley.																																			
Rio Grande City	230	29.77	+.05	29.92	30.03	17	29.73	6	0.30	85.7	+0.4	104.4	21	97.5	70.5	1	77.3	33.9	28.0	21	12.0	12	63.7	70.6	0.00	—1.35	7,040	se.	21	se.	24	0	1	12	17
Brownsville	57	29.93	+.04	29.94	30.06	24	29.75	6	0.31	81.3	—1.7	94.1	24	91.9	68.0	1	75.5	20.1	21.8	1	11.2	11	78.2	73.1	0.54	—1.31	5,366	s.	22	s.	12	3	2	5	23
Tennessee.																																			
Nashville	549	29.47	+.06	30.01	30.19	18	29.78	4	0.41	75.4	—1.6	92.1	6	84.3	60.2	19	68.2	31.9	24.9	19	8.2	26	73.5	65.8	3.72	—0.48	3,763	e.	30	w.	15	12	8	17	5
Memphis	321	29.70	+.05	30.00	30.16	18	29.75	5	0.41	79.3	+1.2	95.7	6	89.0	64.0	23	70.7	31.7	23.6	13	10.3	22	69.5	67.5	1.52	—3.80	3,842	sw.	28	nw.	8	8	4	16	10
Chattanooga	783	29.25	+.04	30.03	30.20	19	29.81	5	0.39	75.4	+0.4	93.8	6	85.0	59.0	1	67.5	34.8	27.0	14	10.7	30	77.4	67.1	6.09	+1.80	3,181	sw.	26	nw.	13	9	5	16	9
Knoxville	980	29.05	+.03	30.04	30.23	19	29.79	5	0.44	74.1	+0.8	91.0	15	84.4	50.9	1	65.6	34.1	27.0	3	8.6	16	72.8	63.8	3.15	—1.31	3,370	sw.	25	nw.	8	8	6	14	9
Ohio valley.																																			
Pittsburg	766	29.21	+.04	30.00	30.25	24	29.60	5	0.66	68.8	—2.2	94.3	7	81.6	45.9	9	57.5	48.4	33.1	7	14.3	13	64.1	54.6	2.68	—0.89	4,116	nw.	23	s.	13	13	1	18	11
Columbus	805	29.18	+.05	30.01	30.25	19	29.64	21	0.61	68.8	—2.2	89.6	7	78.8	45.5	9	59.2	44.1	20.9	8	10.1	27	72.4	59.0	5.08	+1.27	4,381	sw.	32	sw.	5	9	5	18	7
Indianapolis	753	29.23	+.07	30.01	30.23	18	29.64	4	0.59	68.8	—3.9	90.1	7	79.5	41.1	9	58.6	49.0	33.3	11	9.9	12	71.0	57.9	5.74	+0.29	3,065	s.	23	w.	4	10	7	15	8
Greencastle	...	29.10	...	30.01	30.24	18	29.64	4	0.60	68.0	...	86.3	7	70.9	42.6	9	60.8	43.7	31.8	8	7.4	16	74.8	59.3	8.64	...	4,202	sw.	23	sw.	4	10	0	15	9
Cincinnati	628	29.38	+.08	30.02	30.25	18	29.69	4	0.56	69.6	—4.6	89.9	7	79.6	48.1	9	61.1	41.8	29.0	11	11.1	29	69.8	58.5	3.98	—0.81	4,278	sw.	34	nw.	21	13	7	10	7
Louisville	530	29.47	+.09	30.05	30.27	18	29.75	4	0.52	73.6	—1.2	94.5	7	83.4	49.8	9	62.4	44.7	32.0	6	9.0	5	72.0	63.3	3.18	—1.31	5,452	n.	28	sw.	21	7	6	15	9
Lower lake region.																																			
Detroit	661	29.32	+.07	30.01	30.26	10	29.61	4	0.65	65.9	—1.5	87.0	15	75.8	44.2	9	56.4	42.8	27.7	28	5.4	3	71.1	55.8	3.36	—0.44	6,034	s.	28	s.	13	11	4	13	13
Toledo	651	29.33	+.07	30.00	30.25	10	29.60	4	0.60	68.3	—1.6	88.7	7	76.5	44.7	9	57.9	44.0	27.7	28	10.7	5	68.2	56.9	3.36	—0.34	4,420	w.	24	nw.	3	10	2	18	10
Sandusky	639	29.35	+.04	30.01	30.27	24	29.62	5	0.64	67.0	—1.0	96.0	7	78.2	45.9	8	57.5	50.1	30.5	3	10.5	30	67.1	54.9	6.61	+1.99	8,231	sw.	44	n.	21	12	2	17	11
Cleveland	690	29.30	+.06	30.02	30.28	21	29.60	5	0.68	64.5	—3.2	88.4	7	74.2	46.2	10	56.2	42.2	29.9	28	9.9	4	74.4	55.7	7.22	+2.97	6,395	n.	28	sw.	13	10	0	10	14
Erie	681	29.29	+.04	30.00	30.28	10	29.60	5	0.68	63.6	—4.0	85.0	21	73.3	45.0	10	51.4	40.0	25.8	12	10.7	9	73.2	54.5	0.84	+2.89	6,338	w.	28	nw.	22	10	4	11	15
Buffalo	690	29.26	+.04	29.98	30.27	10	29.58	5	0.70	60.9	—3.8	79.9	15	68.0	44.4	9	53.7	35.5	24.5	12	3.5	1	81.6	54.9	6.39	—3.24	7,220	sw.	42	sw.	23	14	8	9	13
Rochester	621	29.32	+.01	29.97	30.26	10	29.54	5	0.72	63.1	—2.9	89.9	13	76.5	40.9	23	52.7	49.0	32.8	12	14.3	4	76.7	55.3	4.27	+1.02	7,306	w.	34	w.	23	8	10	11	9
Oswego	334	29.60	—.01	29.95	30.26	10	29.50	5	0.76	59.8	—4.7	85.0	13	69.9	39.2	9	50.5	45.8	31.3	12	11.4	21	72.6	50.3	3.94	+0.60	6,831	w.	36	ne.	5	12	7	13	10
Upper lake region.																																			
Duluth	644	29.25	+.04	29.97	30.32	30	29.57	15	0.75	57.3	—1.0	86.1	18	66.6	33.3	8	48.6	52.8	31.4	8	7.3	6	68.5	45.3	4.82	—0.55	5,054	ne.	32	nw.	15	15	4	19	7
Marquette	673	29.23	+.01	29.95	30.29	30	29.53	6	0.76	55.8	—3.2	83.0	18	67.1	32.7	8	45.3	50.3	31.9	6	7.7	16	71.7	45.7	4.34	—0.79	5,519	nw.	31	se.	12	13	5	14	11
Escanaba	612	29.29	+.02	29.94	30.27	30	29.55	6	0.72	59.4	—1.2	80.3	15	69.6	34.1	8	49.0	46.2	34.0	23	12.0	20	65.5	47.0	1.94	—2.85	6,566	s.	36	n.	7	13	7	15	8
Milwaukee	697	29.26	+.06	29.99	30.30	30	29.63	7	0.67	60.2	—2.9	85.6	7	70.8	39.8	8	50.5	45.8	43.1	7	9.8	5	75.2	51.8	6.49	+2.42	6,929	se.	53	sw.	7	13	3	18	9
Chicago	661	29.31	+.07	30.00	30.27	30	29.58	7	0.70	65.4	—0.2	87.7	7	73.6	42.1	8	57.1	45.6	29.3	6	5.0	5	70.8	55.1	5.20	+0.92	4,649	e.	24	n.	13	11	6	15	9
Grand Haven	620	29.35	+.07	30.00	30.26	30	29.62	4	0.64	59.8	—4.9	82.1	14	68.3	39.3	10	51.9	42.8	29.8	14	5.9	13	71.9	50.1	5.64	+1.10	6,460	s.	31	n.	21	9	2	10	12
Mackinaw City	605	29.32	—.01	29.97	30.28	30	29.60	7	0.67	56.8	—3.1	81.7	15	67.5	37.3	8	47.5	44.5	31.6	15	12.0	9	72.8	47.5	1.88	—1.05	6,452	nw.	26	w.	15	7	5	14	11
Alpena	609	29.31	+.02	29.96	30.19	10	29.57	7	0.62	58.3	—1.2	87.0	12	70.8	37.0	8	47.7	50.0	32.9	7	12.9	3	75.4	49.6	1.74	—2.30	6,475	se.	30	nw.	8	8	5	13	12
Port Huron	633	29.32	+.05	29.99	30.26	10	29.66	7	0.60	61.9	—1.1	86.5	7	72.5	40.0	8	52.4	46.5	33.3	28	6.6	3	75.1	53.3	5.29	+1.41	6,109	s.	30	n.	28	16	6	7	17

Table of miscellaneous meteorological data for June, 1885—Signal Service observations—Continued.

Stations.	Elevation above sea-level.	Atmospheric pressure (in inches and hundredths). Mean actual barometer.	Departure from normal.	Mean reduced barometer.	Extremes. Highest barometer	Date.	Lowest barometer	Date.	Monthly range of barometer.	Temperature of the air (in degrees Fahrenheit). Monthly mean.	Departure from normal.	Extremes. Max.	Date.	Mean max	Min.	Date.	Mean min	Monthly range.	Daily ranges. Greatest.	Date.	Least.	Date.	Mean rel. humidity.	Mean dew-point.	Precipitation.	Departure from normal	Winds. Total movement.	Prevailing direction.	Max. velocity. Miles p.hr	Direction.	Date.	No. of rainy days.	No. of cloudy days.	No. of fair days.	No. of clear days.
Extreme northwest.																																			
Fort Buford	1,930	27.92	+.06	29.92	30.34	21	29.16	6	1.18	61.8	− 2.2	91.0	19	76.5	36.1	8	50.5	54.9	35.1	17	11.2	5	72.4	51.7	6.05	+3.37	6,308	ne.	56	ne.	7	13	12	14	4
Bismarck	1,694	28.16	+.07	29.92	30.33	21	29.15	6	1.18	62.0	− 1.8	87.1	19	74.0	33.7	8	50.8	53.4	32.2	17	10.5	7	72.5	52.1	2.39	−1.25	5,470	se.	43	e.	6	14	5	19	6
Fort Totten	......	28.35	......	29.92	30.27	21	29.27	6	1.00	62.0	......	88.2	19	72.8	34.6	8	49.3	53.6	35.0	1	11.6	3	75.1	51.4	3.45	......	7,774	s.	46	se.	6	16	10	11	9
Moorhead	923	28.95	+.04	29.92	30.27	8	29.31	6	0.96	62.3	− 2.5	85.6	20	74.5	30.0	8	51.4	55.6	34.7	20	12.2	15	81.0	55.9	7.92	+4.12	6,695	n.	42	se.	6	12	10	13	7
Saint Vincent	804	29.11	+.07	29.97	30.32	8	29.40	6	0.92	58.8	− 3.3	84.1	18	71.0	32.0	8	47.9	52.1	34.9	22	11.7	3	83.9	53.5	2.92	+0.30	5,788	w.	32	n.	20	12	7	15	8
Upper Mississippi valley.																																			
Saint Paul	801	29.12	+.06	29.96	30.28	30	29.51	5	0.78	66.9	− 0.3	88.6	20	79.4	36.0	8	57.2	52.6	34.7	7	11.2	2	81.3	60.6	3.73	−1.29	3,910	s.	28	s.	6	11	8	14	8
La Crosse	725	29.20	+.05	29.94	30.26	30	29.56	6	0.70	67.0	− 1.8	86.0	26	75.6	41.8	8	58.6	44.2	28.2	7	7.7	2	72.1	57.1	4.92	+0.19	4,757	s.	30	sw.	15	14	4	15	11
Dubuque	665	29.29	......	29.96	30.27	30	29.54	7	0.73	66.7	− 1.9	88.0	26	77.2	44.0	9	57.9	44.0	26.8	9	8.6	4	71.8	56.5	6.16	+0.51	3,386	s.	26	nw.	27	15	4	18	8
Davenport	615	29.36	+.07	29.99	30.29	30	29.59	7	0.70	68.2	− 2.3	87.2	7	77.7	45.7	8	59.5	41.5	25.5	7	7.6	14	71.3	57.6	2.08	−2.91	4,620	sw.	34	w.	7	11	6	18	6
Des Moines	849	29.11	+.07	29.98	30.28	30	29.60	6	0.67	69.0	− 0.6	93.1	20	81.1	43.9	9	60.4	49.2	33.4	1	9.6	3	76.7	60.9	5.03	−3.36	2,671	s.	18	n.	7	13	5	21	4
Keokuk	618	29.36	+.09	29.99	30.26	30	29.63	7	0.63	70.1	− 2.4	84.8	7	79.0	48.9	9	61.5	39.9	21.6	11	9.0	14	75.0	61.3	0.97	+1.46	5,200	s.	36	sw.	7	14	3	22	5
Springfield	644	29.34	+.06	29.95	30.22	18	29.63	7	0.59	71.0	− 0.5	88.3	7	80.0	50.0	9	62.2	38.3	25.0	11	11.7	23	66.6	58.9	4.18	−2.77	4,408	s.	30	s.	13	12	9	16	5
Saint Louis	583	29.43	+.07	30.01	30.24	18	29.68	4	0.56	73.5	− 1.1	92.0	4	82.5	52.1	9	66.6	39.9	24.2	8	9.7	16	74.5	64.6	7.68	+2.88	6,995	s.	28	sw.	4	11	7	20	3
Cairo	377	29.68	+.07	30.03	30.21	18	29.78	7	0.44	74.5	− 0.9	92.0	7	82.4	53.2	9	66.6	38.8	24.6	8	7.8	12	74.2	65.3	4.63	+0.11	4,650	s.	29	w.	21	11	5	17	3
Missouri valley.																																			
Fort Bennett	1,510	28.38	......	29.92	30.28	21	29.16	5	1.12	65.3	− 2.9	89.8	20	78.5	38.0	8	55.2	51.8	36.4	17	7.0	23	71.5	54.7	5.62	+2.07	6,321	se.	44	w.	5	14	8	18	4
Fort Sully	......	......	......	......	......	...	......	...	......	67.7	......	96.6	19	81.7	36.3	8	53.8	60.3	......	...	......	...	......	......	5.12	+1.78	......	......	...	......	...	17	...	...	...
Yankton	1,228	28.68	+.06	29.95	30.28	22	29.47	5	0.81	67.2	− 1.5	92.1	26	79.1	42.8	9	58.1	49.3	20.9	26	12.3	23	75.2	58.2	2.90	−2.21	4,984	se.	44	se.	6	13	8	17	5
Huron	1,305	28.59	+.05	29.93	30.27	22	29.35	6	0.92	65.7	− 0.6	89.0	19	77.8	38.1	8	55.3	50.9	32.3	17	9.8	23	79.3	58.8	5.43	+0.97	6,209	se.	42	se.	6	13	5	17	8
Omaha	1,113	28.84	+.07	29.97	30.27	22	29.54	6	0.73	71.1	− 0.6	93.8	12	81.9	48.8	22	62.7	45.0	33.0	12	10.2	23	72.5	61.3	2.67	−4.06	5,938	s.	35	e.	14	10	7	16	7
Leavenworth	842	29.11	+.05	29.96	30.23	29	29.01	7	0.63	72.2	− 1.7	96.0	27	82.5	51.0	9	63.9	45.0	30.0	27	8.0	23	75.4	63.5	4.00	−1.71	4,601	s.	32	nw.	21	12	8	18	4
Lamar	1,028	28.94	......	29.98	30.21	29	29.72	5	0.49	72.0	......	90.4	27	81.6	53.0	9	64.2	37.4	25.0	27	5.2	23	78.5	64.4	3.12	......	7,577	s.	36	n.	28	11	8	19	3
Northern slope.																																			
Fort Assinaboine	2,710	......	......	......	......	...	......	...	......	......	......	......	...	......	......	...	......	......	......	...	......	...	......	......	......	......	......	......	...	......	...	...	...	...	...
Fort Benton	2,700	27.20	......	29.97	30.29	21	29.46	5	0.83	62.6	− 0.6	98.5	28	78.7	38.0	15	50.7	60.5	47.0	28	11.3	6	66.6	50.2	5.60	+3.75	4,027	ne.	36	sw.	5	14	5	20	5
Fort Shaw	3,550	26.32	......	29.90	30.19	21	29.45	5	0.74	59.8	+ 0.1	88.7	30	72.9	32.1	8	47.2	56.6	36.9	28	9.6	11	64.3	46.4	2.83	+0.60	3,438	w.	36	w.	6	16	6	18	6
Helena	4,044	25.81	+0.1	29.88	30.15	21	29.43	5	0.72	56.8	− 2.3	86.3	29	68.5	34.1	7	46.7	52.2	31.8	28	7.6	6	65.2	44.2	44.5	+2.22	4,413	sw.	31	w.	6	18	6	18	6
Fort Custer	3,040	26.81	+0.6	29.87	30.20	21	29.25	5	0.96	62.3	− 2.2	91.0	29	76.6	33.0	7	48.5	58.0	38.0	4	12.0	7	65.8	49.1	4.18	+1.67	5,538	e.	55	w.	6	11	7	20	3
Poplar River	2,030	27.83	......	29.94	30.32	21	29.38	6	0.95	63.5	......	94.1	29	77.5	35.9	15	50.0	58.2	41.1	28	9.9	5	82.2	57.6	4.51	+3.56	5,323	e.	32	se.	5	11	3	18	9
Fort Maginnis	4,340	25.56	......	29.90	30.20	21	29.40	6	0.80	56.2	− 3.2	89.2	30	70.1	32.6	15	46.2	56.6	36.2	16	11.6	11	64.5	43.5	4.41	+3.33	6,582	n.	54	n.	6	15	7	18	5
Deadwood	4,600	25.40	+.05	29.84	30.14	28	29.18	6	0.96	57.4	− 3.1	81.0	29	67.3	35.0	16	48.5	46.0	30.2	17	7.9	22	76.6	49.4	4.83	+0.73	3,673	n.*	25	sw.	6	18	6	16	8
Cheyenne	6,089	24.05	+.01	29.80	30.07	21	29.24	5	0.83	57.6	− 3.8	81.1	25	72.6	35.3	8	46.3	45.8	35.6	13	17.9	6	67.2	45.0	2.75	+1.33	8,249	s.	50	s.	5	12	2	19	9
North Platte	2,841	27.09	+.07	29.87	30.16	22	29.39	5	0.77	65.7	− 2.6	88.8	1	78.4	44.1	9	55.8	44.7	29.6	1	11.4	3	72.9	55.6	3.79	+0.07	6,679	e.	48	se.	5	14	8	15	7
Middle slope.																																			
Denver	5,294	24.77	+.05	29.80	30.11	21	29.27	5	0.84	63.8	− 3.0	86.2	1	78.4	41.0	7	51.2	45.2	39.2	10	16.2	21	50.6	41.4	0.66	−0.93	5,723	s.	42	s.	5	9	4	14	12
Pike's Peak	14,134	17.99	......	29.80	29.98	27	29.36	5	0.62	29.8	− 2.9	43.8	26	36.7	14.0	6	25.0	29.8	16.8	20	7.0	8	81.4	24.7	1.39	−0.44	14,473	sw.	78	w.	6	13	3	14	13
Dodge City	2,517	27.39	+.05	29.86	30.19	21	29.48	5	0.71	71.2	− 1.7	95.0	12	83.4	51.5	16	61.8	43.5	36.5	6	10.7	30	69.2	59.0	2.02	−1.04	9,667	se.	52	se.	5	10	7	15	8
West Las Animas	3,905	26.03	+.01	29.78	30.08	28	29.34	5	0.74	70.2	+ 1.3	95.8	11	86.6	44.9	7	56.4	50.9	42.9	12	16.2	29	62.3	54.6	2.14	−0.50	7,749	e.	42	w.	5	10	6	9	15
Fort Elliott	2,650	27.23	......	29.88	30.09	29	29.60	5	0.49	72.2	− 1.2	95.0	20	83.6	54.0	9	62.8	41.0	33.7	1	12.2	29	75.9	62.8	9.82	+6.87	8,708	se.	40	n.	17	13	6	16	8
Fort Reno	......	......	......	......	......	...	......	...	......	...	......	95.3	27	85.3	......	...	......	......	......	...	......	...	......	......	9.41	+2.93	......	......	...	......	..	14	...	...	...
Concordia	......	28.51		29.91	30.21	22	29.41	5	0.70	70.4	......	101.7	12	82.7	46.2	16	60.4	54.5	32.8	27	6.9	22	80.9	63.7	1.12	......	6,848	se.	29	se.	5	3	3	21	6
Southern slope.																																			
Fort Sill	1,200	28.72	+.02	29.89	30.15	22	29.65	5	0.49	75.0	− 2.8	93.0	20	86.4	59.0	1	64.7	34.0	28.0	8	9.5	24	82.3	68.6	8.16	+3.14	7,858	s.	38	se.	14	16	6	14	10
Fort Concho	1,900	28.07	+.03	29.91	30.08	28	29.66	5	0.42	80.9	+ 1.0	108.2	21	96.7	61.9	3	68.1	46.3	38.9	31	21.4	28	69.7	68.6	4.55	+2.11	7,976	s.	52	e.	30	4	3	18	9
Fort Stockton	3,010	26.96	+.04	29.85	29.98	28	29.62	5	0.36	79.0	0.0	104.2	21	94.8	59.0	2	65.6	45.2	41.0	12	3.8	28	76.1	70.2	2.86	+0.80	9,357	se.	45	se.	10	12	2	7	21
Fort Davis	4,928	25.20	......	29.77	29.88	20	29.58	5	0.30	75.1	+ 0.3	97.7	12	90.4	59.0	8	64.5	38.7	35.5	21	8.3	28	49.0	51.0	1.17	−1.23	4,866	sw.	29	ne.	16	7	6	12	12
Southern plateau.																																			
Fort Verde	......	......	......	......	......	...	......	...	......	73.3	− 4.9	99.5	27	90.3	46.0	7	56.2	53.5	......	...	......	...	......	......	0.05	+0.26	......	......	...	......	...	1	...	...	...
Prescott	5,389	24.75	+.04	29.79	29.97	20	29.53	5	0.44	63.5	− 3.1	88.7	27	80.6	37.6	13	47.3	51.1	43.2	27	21.7	2	40.7	36.3	0.07	−0.10	6,366	s.	32	s.	10	2	3	10	17
Wickenburg	......	......	......	......	......	...	......	...	......	75.1	− 4.1	105.0	21	95.6	44.5	12	54.6	60.5	......	...	......	...	......	......	0.05	+0.03	......	......	...	......	...	2	...	...	...
Phoenix	......	......	......	......	......	...	......	...	......	71.6	......	109.8	28	101	32.8	6	42.3	77.0	......	...	......	...	......	......	0.04	−0.09	......	......	...	......	...	1	...	...	...
Fort Grant	4,856	25.24	......	29.74	29.89	20	29.58	4	0.31	71.6	− 4.5	92.5	27	85.8	48.8	6	62.0	43.7	33.5	6	10.2	1	32.8	38.8	0.73	−0.08	5,036	w.	35	se.	28	8	2	9	19
Fort Thomas	2,710	27.17	......	29.77	29.93	25	29.58	4	0.35	75.8	− 3.1	102.0	21	94.1	43.4	6	56.9	58.6	50.1	16	13.1	2	35.4	41.9	0.18	−0.29	......	sw.	...	......	...	3	2	7	21
Fort Apache	5,050	25.06	+.06	29.79	29.94	20	29.58	4	0.35	74.9	− 2.0	93.9	21	85.8	33.3	6	45.3	60.6	52.4	16	11.1	2	43.7	39.8	0.82	−0.20	4,683	sw.	29	sw.	13	17	3	10	17
San Carlos	......	......	......	......	......	...	......	...	......	77.1	......	107.5	21	97.6	46.2	7	56.5	61.3	......	...	......	...	......	......	0.47	+0.07	......	......	...	......	...	6	...	...	...
Fort Bowie	......	......	......	......	......	...	......	...	......	75.5	......	100.0	20	89.9	51.0	11	61.1	49.0	......	...	......	...	......	......	0.66	......	......	......	...	......	...	5	...	...	...
Maricopa	......	......	......	......	......	...	......	...	......	85.5	......	109.0	27	102	57.0	8	69.3	52.0	......	...	......	...	......	......	0.04	......	......	......	...	......	...	3	...	...	...
Willcox	......	......	......	......	......	...	......	...	......	72.0	......	103.5	20	94.4	40.0	15	49.6	63.5	......	...	......	...	......	......	0.34	......	......	......	...	......	...	8	...	...	...
El Paso	3,764	26.24	+.05	29.80	29.94	28	29.57	5	0.37	78.3	− 2.6	106.6	21	99.2	59.4	15	65.0	47.2	41.8	11	21.5	29	33.1	40.0	2.63	+2.52	3,503	w.	26	w.	23	9	3	17	10
Santa Fé	......	23.35	+.11?	29.85	30.02	28	29.61	5	0.42	61.6	− 3.8	82.5	21	74.5	40.0	6	51.5	42.5	29.0	6	5.5	29	37.4	31.3	1.57	+0.43	4,902	sw.	26	w.	22	7	2	19	9
Keeler	......	26.22	......	......	26.44	20	25.99	10	0.45	69.7	......	94.4	28	83.0	46.3	5	57.2	48.1	32.7	28	15.5	3	39.4	42.2	0.08	......	4,413	sw.	45	s.	10	1	0	2	28
Middle plateau.																																			
Salt Lake City	4,348	25.58	.00	29.79	29.96	20	29.49	5	0.46	63.8	− 3.9	90.9	29	75.8	38.8	7	53.7	52.1	28.4	16	8.9	22	58.7	47.9	2.67	+2.00	3,853	se.	27	e.	29	6	4	17	9
Fort Bridger	......	......	......	......	......	...	......	...	......	53.3	......	80.5	27	68.9	23.2	7	37.6	57.3	......	...	......	...	......	......	0.70	......	......	......	...	......	...	13	...	...	...
Winnemucca	......	25.57	+.02	29.82	30.02	20	29.60	2	0.42	59.8	− 4.3	87.8	28	73.5	30.8	6	47.0	57.0	36.5	18	17.6	13	46.0	35.7	2.41	+1.69	5,073	sw.	32	sw.	9	8	3	9	18
Montrose	......	24.30	......	29.80	29.98	20	29.49	5	0.49	62.1	......	85.7	16	78.9	38.2	8	49.7	47.5	41.7	16	17.0	5	40.8	33.8	1.02	......	7,093	se.	50	sw.	5	4	3	14	13
Northern plateau.																																			
Dayton	1,667	28.22	......	29.97	30.22	26	29.73	9	0.49	61.7	− 1.3	89.7	28	75.9	38.0	3	50.6	51.7	39.2	3	10.0	6	67.4	49.3	2.20	+1.10	3,335	sw.	20	sw.	20	11	8	15	7
Lewiston	780	29.12	......	29.90	30.17	27	29.72	9	0.45	65.8	− 1.1	91.0	29	77.8	47.1	2	55.1	43.9	23.0	28	10.4	6	66.6	53.1	4.91	+3.03	689	se.	25	nw.	30	13	5	15	10
Spokane Falls	1,910?	27.94	+.03	29.99	30.25	27	29.74	4	0.51	63.9	+ 0.1	87.0	28	74.5	44.4	6	53.4	42.6	30.2	27	8.7	6	69.7	53.2	3.40	+2.00	3,569	sw.	22	se.	12	16	7	18	5
Cœur d'Alene	......	......	......	......	......	...	......	...	......	61.2	......	87.0	28	73.6	41.0	3	48.8	46.0	......	...	......	...	......	......	2.11	+1.41	......	......	...	......	...	8	...	...	...
Boisé City	2,750	27.10	......	29.88	30.13	20	29.57	4	0.56	64.3	− 1.9	98.6	28	77.0	41.0	7	53.1	57.6	38.0	28	9.0	6	62.9	50.2	1.08	+0.14	3,065	nw.	30	w.	19	9	5	12	13
Fort Klamath	......	......	......	......	......	...	......	...	......	59.1	......	80.0	27	67.3	29.0	5	26.5	51.0	......	...	......	...	......	......	1.38	......	......	......	...	......	...	12	...	...	...
North Pacific coast region																																			
Astoria	......	......	......	......	......	...	......	...	......	57.6	......	71.0	28	63.3	43.0	8	51.9	28.0	......	...	......	...	......	......	2.78	......	......	......	...	......	...	14	...	...	...
Olympia	36	29.98	.00	30.02	30.40	21	29.71	8	0.70	61.1	+ 2.6	82.0	24	72.0	37.0	2	49.5	45.0	36.9	24	10.1	10	72.0	50.9	0.79	−0.42	1,883	n.	14	w.	5	7	14	8	8
Portland	80	29.95	.00	30.04	30.26	20	29.71	8	0.55	61.0	− 0.8	86.2	27	73.7	42.0	24	50.5	44.2	40.0	24	10.5	15	70.1	50.3	1.77	−0.02	2,295	s.	16	w.	5	10	14	11	5
Roseburg	523	29.49	+.03	30.04	30.23	22	29.78	8	0.44	59.2	− 2.3	84.7	27	71.1	38.9	7	49.8	45.8	35.4	27	8.8	15	68.7	47.7	1.53	+0.52	2,273	n.	15	n.	2	7	14	13	3
Fort Canby	179	29.85	......	30.05	30.27	20	29.74	8	0.54	55.8	......	65.8	27	60.1	46.5	5	51.7	19.3	16.4	8	4.6	18	87.0	51.9	3.33	......	4,445	w.	22	w.	5	16	18	12	0
Port Angeles	14	30.00	......	30.02	30.25	20	29.71	9	0.54	54.2	......	69.1	28	61.2	36.7	1	48.0	32.4	23.0	1	5.8	19	83.3	49.1	0.67	......	5,195	nw.	28	nw.	5	7	5	18	7
Tatoosh Island	......	29.95	......	30.05	30.29	20	29.73	9	0.56	54.3	......	65.8	27	59.4	45.2	7	50.2	20.6	15.0	8	5.2	15	87.5	50.5	1.77	......	4,640	sw.	22	nw.	5	11	16	14	0
Pysht	......	......	......	......	......	...	......	...	......	57.8	......	73.0	16	68.3	38.0	5	47.3	35.0	......	...	......	...	......	......	2.17	......	......	......	...	......	...	10	...	...	...
Mid. Pacific coast region																																			
Cape Mendocino	637	29.37	......	30.04	30.19	5	29.86	9	0.33	53.7	− 0.9	69.6	26	59.7	44.0	2	48.0	25.6	19.2	25	6.9	21	87.0	49.8	1.32	+0.85	10,821	n.	43	nw.	1	3	4	22	4
Red Bluff	332	29.59	+.05	29.92	30.12	26	29.67	1	0.45	71.6	− 4.8	97.0	27	83.3	48.0	6	58.2	49.0	23.0	21	12.5	4	46.8	47.1	1.37	+1.09	4,770	s.	24	s.	9	5	3	6	21
Sacramento	65	29.89	+.08	29.94	30.12	26	29.73	1	0.39	66.2	− 2.8	91.0	27	79.9	51.0	6	55.9	40.0	34.0	23	13.0	9	59.0	50.4	0.11	−0.20	6,716	s.	24	sw.	9	2	1	5	24
San Francisco	60	29.96	+.05	30.01	30.17	26	29.82	1	0.35	56.9	− 1.6	67.0	26	62.7	49.5	2	53.0	17.5	13.0	28	7.0	23	81.4	51.0	0.19	−0.14	10,069	w.	36	w.	21	0	7	16	7
South Pacific coast region																																			
Los Angeles	371	29.62	+.05	29.97	30.09	25	29.84	6	0.25	65.0	− 0.5	90.1	20	80.8	47.0	18	53.6	43.1	40.3	18	16.0	10	68.9	53.1	trace	−0.22	3,743	w.	21	nw.	4	0	1	14	15
San Diego	67	29.91	+.04	29.95	30.09	25	29.84	6	0.25	64.3	− 0.1	74.5	21	70.9	52.5	26	58.3	22.0	18.6	11	6.5	10	74.8	55.7	0.06	−0.01	4,564	w.	20	nw.	20	2	6	19	5
Yuma	141	29.68	......	29.80	29.96	20	29.65	23	0.31	81.2	− 4.7	104.1	29	47.3	59.6	5	67.1	44.5	37.2	5	19.7	4	50.2	59.3	0.00	−0.01	4,684	nw.	32	nw.	4	0	3	6	21
San Luis Obispo	277	29.75	......	30.02	30.13	29	29.92	1	0.21	58.3	......	82.9	28	......	43.4	11	... ..	39.5	35.8	8	14.1	22	74.8	49.7	0.06	......	6,159	w.	26	nw.	4	2	4	16	10

RAILWAY WEATHER SIGNALS.

Professor P. H. Mell, jr., director of the "Alabama Weather Service," in his report for June, states:

The verification of prediction for the whole state was 98 per cent. for temperature and 97 per cent. for weather.

The following roads comprise this system: Western, of Alabama; Atlanta and West Point, of Georgia; South and North; Montgomery and Mobile; Mobile and Girard; Georgia Pacific; East Tennessee, Virginia and Georgia; Northeastern, of Georgia.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroral displays were observed during June, as follows:

1st.—Marquette, Michigan: an aurora was observed from 11 to 11.20 p. m.

1st.—Escanaba, Michigan: faint aurora from 10.42 to 11.28 p. m.

1st.—Mountainville, New York.

1st.—Yutan, Nebraska.

2d.—Mountainville, New York.

3d.—Cambridge, Massachusetts: aurora suspected.

3d.—Mount Washington, New Hampshire: at 11 p. m. an auroral light, with occasional streamers, extended over 80° of horizon, and to an altitude of 15°; the display ended during the early morning of the 4th.

3d.—Eastport, Maine: a very faint auroral arch of 10° altitude was observed from 7.30 to 10 p. m.

4th.—Blackwell, North Carolina: "auroral light flashing up in the northwest at 8.10 p. m." A similar display was also observed on the 8th.

4th.—Ithaca, New York: a faint auroral arch was visible at 10 p. m.

5th.—Sussex, Wisconsin.

7th.—Yutan, Nebraska.

8th.—Eastport, Maine: a faint auroral light, of pale straw color, was observed from 9 p. m. until 1 a. m. of the 9th.

8th.—Readville, Massachusetts (Blue Hill observatory): aurora at 11.15 p. m.

8th and 11th.—Yutan, Nebraska.

13th.—Webster, Dakota.

13th.—Yutan, Nebraska.

15th.—Wellsborough, Pennsylvania.

16th.—Yutan, Nebraska.

18th.—Tiffin, Ohio.

19th.—Bangor, Maine.

22d.—Fort Bennett, Dakota: an aurora was observed from 10.25 to 10.55 p. m., consisting of columns of light; cloudiness partially obscured the display.

22d.—Westerville, Ohio.

23d.—Mountainville, New York.

23d.—Syracuse, New York.

24th.—Hudson, Michigan.

24th.—Manhattan, Kansas: quite a marked auroral display was observed at 9.20 p. m.; notwithstanding the moonlight, streamers, extending nearly to the North star, were visible.

24th.—Fort Bennett, Dakota: an aurora was visible from 10.58 to 11.20 p. m., consisting of an arch which spanned 45° of the horizon and extended to an altitude of 20°; from the arch several columns of pale light extended upward 45°.

24th.—Huron, Dakota: auroral beams were observed at intervals during the evening; a similar display was also observed during the evening of the 25th.

24th.—Fort Totten, Dakota: an auroral display was visible from 10 p. m. until daylight of the 25th; shooting beams of greenish color, with a motion from west to east, extended to the zenith from all parts of the northern sky; the display was most brilliant at 11.55 p. m.

24th.—Marquette, Michigan: an aurora was observed from 11 to 11.40 p. m.; streamers extended beyond the zenith. The display resembled that observed here on May 27th.

24th.—Alpena, Michigan: an aurora appeared at 8.50 p. m., consisting of a diffuse light on the northern horizon; at 10 p. m. beams, having an apparent motion from east to west, shot towards the zenith; at 11.50 p. m. the beams faded away and the display disappeared at 12.40 a. m. on the 25th.

24th.—Escanaba, Michigan: a bright aurora appeared at 9.43 p. m.; the light rested upon a dark segment which extended to an altitude of 20°; beams rose to within 15° of the zenith, and occasional flashes of light, resembling lightning, were observed.

24th.—Oswego, New York: an auroral display, partly obscured by cloudiness, was observed from 10.30 p. m. until the early morning of the 25th.

24th.—Erie, Pennsylvania: an aurora was visible from 10.40 to 11.20 p. m., extending from northeast to northwest; streamers rose to an altitude of 45°.

24th.—Portland, Maine: a faint auroral display was observed from 10.30 p. m. until after midnight.

24th.—Mount Washington, New Hampshire: an aurora appeared at 9.22 p. m.; the display consisted of irregular streamers, of varying brilliancy, extending to the zenith.

24th.—Rochester, New York: a faint aurora was observed at 10.25 p. m., extending from northeast to northwest and to an altitude of 25°; the display consisted of a pale, yellow light; no streamers were visible.

24th.—Westerville, Ohio.

25th.—Gardiner, Maine: bright auroral beams were observed at 11.30 p. m., although the moon shone brightly at that hour.

25th.—Cambridge, Massachusetts: aurora suspected.

25th.—Westerville, Ohio.

25th.—Bismarck, Dakota: a faint aurora was observed at 1.15 a. m., covering 90° of the horizon and extending to an altitude of 45°

25th.—Fort Totten, Dakota: auroral light in the north at 11.55 p. m., with bright, shooting beams of yellow and green colors. At 1.20 a. m. on the 26th the display was still visible.

26th.—Fort Totten, Dakota: aurora from 10 p. m. until 1 a. m. of the 27th.

30th.—Westerville, Ohio.

THUNDER-STORMS.

Thunder-storms occurred in the various districts as follows:

New England.—1st, 4th, 5th, 7th, 8th, 9th, 14th, 16th, 17th, 22d, 23d, 24th, 26th to 30th.

Middle Atlantic states.—2d, 4th, 5th, 7th, 8th, 11th, 14th to 17th, 21st, 22d, 25th to 28th.

South Atlantic states.—3d, 5th, 7th to 13th, 15th to 30th.

Florida peninsula.—4th to 18th, 20th, 21st, 23d to 27th, 29th, 30th.

East Gulf states.—8th, 10th to 14th, 16th to 20th, 22d to 26th, 29th.

West Gulf states.—7th to 30th.

Rio Grande valley.—14th, 24th, 25th, 28th, 30th.

Tennessee.—3d to 16th, 20th, 21st, 22d, 25th, 26th, 27th, 29th.

Ohio valley.—2d to 8th, 11th to 16th, 19th, 20th 21st, 26th, 27th, 28th.

Lower lake region.—3d to 8th, 12th to 16th, 20th to 23d, 26th, 27th, 28th.

Upper lake region.—1st to 4th, 6th, 7th, 11th to 15th, 18th to 21st, 26th, 27th, 28th.

Extreme northwest.—1st to 6th, 9th to 14th, 16th, 18th, 19th, 20th, 25th, 26th, 27th, 29th.

Upper Mississippi valley.—1st to 16th, 18th to 22d, 25th, 26th, 27th.

Missouri valley.—1st to 30th.

Northern slope.—1st to 5th, 8th, 10th to 14th, 17th to 20th, 22d to 30th.

Middle slope.—1st, 2d, 4th, 5th, 8th, 9th, 10th, 15th to 30th.

Southern slope.—3d, 4th, 7th to 11th, 13th to 18th, 22d, 23d, 24th, 26th to 30th.

Southern plateau.—2d to 5th, 14th, 17th, 18th, 21st to 24th, 26th to 30th.

Middle plateau.—4th, 5th, 9th, 13th, 14th, 19th to 23d, 25th, 29th, 30th.

Northern plateau.—1st, 3d, 5th, 9th to 17th, 19 to 25th, 28th, 29th, 30th.

North Pacific coast region.—5th, 9th, 11th, 14th to 17th, 24th, 25th.

Middle Pacific coast region.—Red Bluff, 15th; Oroville, 23d, 30th; College City, 8th, 17th, 22d, 23d, 29th.

The following notes upon the thunder-storms of the month have been prepared by Junior Professor H. A. Hazen:

The collection of data, relating to thunder-storms, upon special cards, has been continued the present year. A large number of the observers of last year continue their records. It is desired that all who take an interest in this matter may aid in this work. Instructions and postage free cards will be sent any one sending his address to the Chief Signal Officer. During June nearly 3,000 distinct records have been received. The days having the largest number of storms were the 7th, 14th, 15th, 20th, 21st, and 27th. Nearly all these storms occurred to the southeast and east of quite marked barometric depressions. A special investigation of storms, at stations about four miles apart in Ohio, has been begun. The storms of the 14th, 100; of the 15th, 200; of the 20th, 225, and of the 21st, 280, have been carefully plotted upon maps, and have shown very interesting results. On the 15th destructive storms are reported from three places in Shelby county, between 13.30h. and 14h. The most extensive series of storms on this date, however, are in a belt about thirty miles wide, running across the state from west to east, with its centre in latitude 39° 30′. High winds and damaging storms are reported from twenty-one places. These began at 13.30h. in the west and ended at 18.30h. in the east. The mean velocity across the state was over forty miles per hour, while the storm-centre had a velocity less than thirty miles. The mean distance from the centre of the depression was five hundred and fifty miles in a sse. direction. These twenty-one storms were surrounded by thunder-storms of less severity and, in many instances, at the boundary of electric action, there were gentle rains without thunder.

On the 21st storms were much more general over the whole state. A group of destructive storms are found in the northeast of the state occurring between 17h. and 20h. Nearly in the centre of this were the tornadoes at Ravenna and Marlborough. As on the 15th, these storms were surrounded by those of much less intensity. The mean velocity of the barometric depression was twenty-six miles, and of the thunder-storm movement thirty-five miles. The following are given as a few of the characteristics of electric storms, as determined by the studies thus far:

1st. A barometric depression is almost an invariable accompaniment. If storms occur without such depression, they are light, and more or less sporadic.

2d. A temperature much above the normal precedes general electric action; this high temperature extends over the whole region, nearly to the low centre, or at least to where rain is falling, in which case the precipitation has a tendency to diminish the heat.

3d. The wind over this region, just before the action sets in, is from the s. or sw., and light, following the law of the gentle gradient to the north.

4th. The storms, with few exceptions, move from the sw. to the ne.

5th. They are almost invariably immediately preceded by a high wind, blowing directly from the centre of most intense action. If the wind takes any other direction, it is from a point slightly to the right of the centre of action, never to the left, *i. e.*, in a direction with the hands of a clock about the centre of action.

6th. This electric action is general over the region to the se. of a low area, though there may be frequent gaps in this region. They seem like sudden outbursts of energy in the atmosphere, dependent indirectly in some unexplained manner upon the barometric depression, though having a velocity somewhat greater than it.

ELECTRICAL PHENOMENA.

Bismarck, Dakota: from 10 p. m. of the 26th until midnight the telegraph wires were so charged with atmospheric electricity that signals were transmitted without the aid of battery, between this place and Fort Yates, Dakota.

The observer on the summit of Pike's Peak reports the following: "during a thunder-storm, on the afternoon of the 28th, unusual electrical manifestations were observed. All pointed objects, even the tips of one's fingers and eyebrows, produced a buzzing noise, resembling the sound made by bees."

OPTICAL PHENOMENA.

SOLAR HALOS.

Solar halos were observed in the various states and territories as follows:

Arizona.—17th, 30th.
Arkansas.—3d, 8th, 10th, 14th, 15th, 19th, 20th, 22d, 26th.
California.—4th, 12th, 14th, 16th, 17th, 19th, 20th, 22d, 23d, 24th, 26th, 27th.
Connecticut.—12th, 20th, 25th.
Dakota.—1st, 5th, 18th, 19th, 20th.
District of Columbia.—1st, 10th.
Florida.—1st to 4th, 8th, 9th, 27th.
Georgia.—2d, 4th, 16th, 18th, 22d.
Illinois.—5th, 9th, 15th, 24th, 25th, 30th.
Indiana.—10th, 30th.
Iowa.—5th, 26th, 30th.
Kansas.—10th, 17th, 18th, 22d, 26th, 29th, 30th.
Maine.—3d, 6th.
Massachusetts.—3d, 21st, 25th, 26th.
Michigan.—4th, 7th, 11th, 24th.
Minnesota.—2d.
Missouri.—3d, 9th, 10th, 16th, 18th, 19th, 20th, 22d, 27th.
New Jersey.—10th, 21st.
New York.—3d, 10th, 11th, 14th, 20th.
North Carolina.—3d, 4th.
Ohio.—3d, 10th, 12th, 13th, 14th, 20th, 21st, 25th, 26th, 27th.
Oregon.—2d, 3d, 4th, 6th, 7th, 8th, 22d, 23d to 29th.
Pennsylvania.—3d, 19th, 25th, 27th.
South Carolina.—2d, 4th, 19th, 25th.
Tennessee.—12th, 15th, 21st, 23d.
Texas.—El Paso, 1st.
Virginia.—3d, 12th, 19th, 29th.
Washington Territory.—19th, 27th, 28th, 29th.
Wisconsin.—Beloit, 16th.
Wyoming.—8th, 9th, 13th, 15th.

LUNAR HALOS.

Lunar halos were observed in the various states and territories as follows:

Arizona.—16th, 20th, 21st, 24th, 26th.
Arkansas.—20th, 24th, 27th.
California.—16th to 19th, 22d.
Colorado.—23d.
Connecticut.—20th, 24th.
Dakota.—17th, 24th, 25th.
Florida.—17th, 18th, 23d, 26th, 27th, 29th.
Georgia.—2d, 4th, 5th, 23d to 27th.
Illinois.—18th, 20th, 21st, 22d, 24th, 25th, 26th.
Indiana.—2d, 16th, 18th, 19th, 21st, 23d to 26th.
Iowa.—24th, 25th, 26th.
Kansas.—15th to 18th, 20th, 23d to 28th, 30th.
Kentucky.—Frankfort, 24th.
Louisiana.—New Orleans, 24th.
Maryland.—Baltimore, 21st, 24th.
Massachusetts.—19th, 20th, 21st, 25th.
Michigan.—15th, 18th, 19th, 20th, 24th, 27th.
Minnesota.—20th, 26th.
Missouri.—1st, 24th.
Nebraska.—17th, 18th, 19th, 22d, 25th, 27th.
New Hampshire.—20th, 24th, 26th, 27th.
New Jersey.—5th, 20th.
New Mexico.—Santa Fé, 17th, 21st.
New York.—19th, 20th, 24th, 26th, 27th.
North Carolina.—5th, 24th.
Ohio.—19th, 23d to 27th.
Oregon.—Albany, 23d, 27th.
Pennsylvania.—5th, 19th, 25th, 26th.
Tennessee.—20th, 21st, 22d, 24th, 25th, 28th.
Texas.—1st, 16th, 18th, 21st, 22d, 23d, 25th, 28th.
Utah.—Nephi, 19th.
Virginia.—15th to 18th, 21st, 22d, 26th, 28th, 29th.
Washington Territory.—21st, 26th, 27th.
Wisconsin.—18th, 20th 26th.

The phases of the moon during June were: last quarter, 5th, 6.59 p. m.; new moon, 12th, 5.36 p. m.; first quarter, 19th, 8.42 a. m.; full moon, 27th, 6.12 a. m.; perigee, 13th, 11.12 a. m.; apogee, 28th, 12.54 a. m.

MIRAGE.

Webster, Dakota, 1st, 2d, 8th, 9th, 23d.
Traverse City, Michigan, 21st.

Grand Haven, Michigan, 9th, 10th, 17th.
Marquette, Nebraska, 6th.
Seward, Nebraska, 26th.
Yutan, Nebraska, 30th.
Blackwell, North Carolina, 30th.
Galveston, Texas, 3d.
Milwaukee, Wisconsin, 21st, Racine Point, twenty-five miles south of station, being plainly visible.

MISCELLANEOUS PHENOMENA.

SUNSETS.

The characteristics of the sky, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from one hundred and sixty-two stations show 4,742 observations to have been made, of which five were reported doubtful; of the remainder, 4,737, there were 3,984, or 84.1 per cent., followed by the expected weather.

SUN SPOTS.

Prof. David P. Todd, director of the Lawrence Observatory, Amherst, Massachusetts, furnishes the following record of sun spots for June, 1885:

Date—June, 1885.	No. of new.		Disappeared by solar rotation.		Reappeared by solar rotation.		Total No. visible.		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
1, 10 a. m.	.....	.....	.....	.....	1	5	6	70‡	
2, 10 a. m.	0	30‡	0	0	0	30‡	5	120‡	
3, 4 p. m.	0	20‡	0	0	0	0	5	150‡	
6, 10 a. m.	1	3	.....	.....	1	3	5	80‡	
8, 10 a. m.	.....	.....	.....	.....	.....	.....	4	60‡	
9, 12 m.	0	0	1	3	0	0	3	60‡	
10, 7 p. m.	2	20‡	1	2	1	2	4	80‡	One spot very large.
11, 5 p. m.	2	10‡	0	0	1	3	6	90‡	Do.
14, 2 p. m.	5	35‡	.....	.....	.....	.....	8	80‡	
17, 2 p. m.	.....	.....	.....	.....	.....	.....	10	170‡	One spot very large.
19, 6 p. m.	.....	.....	.....	.....	0	0	5	170‡	Do.
23, 3 p. m.	2	25‡	.....	.....	.....	.....	8	140‡	

Faculæ were seen at the time of every observation. ‡Approximated.

Prof. L. G. Carpenter, of the Michigan State Agricultural College, Lansing, reports sun-spots during June, as follows: 5th, 3 p. m., six groups, sixty-four spots; 8th, 4.15 p. m., six groups, forty-seven spots; 10th, 8.30 a. m., four groups, forty-four spots; 11th, 2.15 p. m., five groups, forty-six spots; 12th, 9.30 a. m., six groups, fifty-three spots; 16th, 2.30 p. m., nine groups, fifty-five spots; 17th, 4.00 p. m., nine groups, eighty-six spots; 18th, 4.50 p. m., seven groups, sixty-six spots; 19th, 3.30 p. m., five groups, forty-eight spots; 22d, 2.15 p. m., six groups, forty-two spots; 23d, 1.45 p. m., seven groups, fifty-two spots; 29th, 2.45 p. m., eight groups, seventy-one spots; 30th, 3.00 p. m., eight groups, sixty-nine spots.

The following record of sun spots observed on board the American ship "Gatherer," which arrived at San Francisco, California, June 29th, has been received through Commander J. R. Bartlett, U. S. Navy, of the Hydrographic Office:

Date.	Lat. N.	Long. W.	Remarks.
1885.	° ′	° ′	
June 9	14 21	113 00	Two spots observed on the sun, one on the east side, the other on the upper northwest side.
11	16 15	117 45	One spot on the sun.
17	28 42	130 00	Spot on east side of sun, going up.
18	29 53	131 35	Two spots on the sun, one under and toward the centre, all going up.
19	31 14	133 20	Spots on the sun.
20	32 11	134 45	Spots shifting to the west side of the sun and growing larger.
21	32 27	135 00	Spots all over on the west side of sun.
23	35 15	137 00	Spot on the sun well over on west edge.
24	35 26	135 36	Spot well on west edge of sun, going off.
26	36 58	131 20	Spot seen on the sun, just below centre.
27	37 34	129 05	Spot on the sun, most off on the west side.

Mr. H. D. Gowey, of North Lewisburg, Champaign county, Ohio, reports having observed sun spots on the following dates: 1st, 2d, 3d, 6th, 9th, 11th, 13th, 14th, 17th, 18th, 19th, 22d, 23d, 24th, 26th, 27th, 29th, 30th.

DROUGHT.

Little Rock, Arkansas, 5th: the weather is very hot and dry; rain is much needed in this vicinity.

Escanaba, Michigan, 7th: farmers from the surrounding country report that the crops are suffering for rain. At Ford River, eight miles south of this station, no rain has fallen since May 25th.

Quakertown, Bucks county, Pennsylvania, 13th: vegetation is suffering in consequence of dry weather; it is estimated that the yield of grain will not exceed half of an average crop.

Maud, Kingman county, Kansas, 30th: the weather during the month was unusually dry; only 0.19 inch of rain fell from the 1st to 19th.

Fallston, Harford county, Maryland: between the 16th and 28th the weather was very dry and crops suffered for rain.

Somerset, Bristol county, Massachusetts: drought prevailed in this vicinity from the 8th to 28th.

Strafford, Orange county, Vermont, 30th: at the close of the month the severest drought was prevailing that has been experienced for eleven years.

New London, Connecticut: during the latter part of the month this region suffered much from drought; at the end of the month grass was burned to the roots and the crops promised but a poor yield.

Wilton Centre, Will county, Illinois, 30th: a drought has prevailed in this county since April 17th; only about three inches of rain fell during the months of May and June.

Blooming Grove, Pike county, Pennsylvania: at the close of the month the soil was very dry and the oat crop suffering for rain.

Embarras, Waupaca county, Wisconsin, 30th: although frequent rains fell during the month in the surrounding country, in this immediate vicinity drought has prevailed.

EARTHQUAKES.

Cahuenga, Los Angeles county, California: at 3.15 a. m. on the 14th a sharp shock of earthquake, of three or four seconds duration, was felt here. The vibration was from east to west.

Los Angeles, California: at about 6.14 p. m. on the 14th an earthquake shock was felt in this city. It was of from two to three seconds duration, the oscillation being apparently from east to west. The shock was sufficient to awaken persons from sleep.

The San Francisco "Daily Alta Californian" of June 15th, contained the following:

SAN BUENA VENTURA, *June 14th.*—At a quarter past three this morning two shocks of earthquake were felt in this town. They seemed to be from south to north, and lasted about twenty seconds. They were the sharpest shocks felt here for years.

The La Crosse (Wisconsin) "Daily Republican," of June 20th, contained the following:

LONDON, June 20.—Severe shocks of earthquake were experienced this morning at Berne and Geneva, Switzerland. The extent or nature of the damage has not been reported.

Salinas, Monterey county, California: at about 8.30 p. m. on the 25th a slight shock of earthquake was felt here. The vibration was from north to south.

The following is from the "New York Journal of Commerce" of June 26th:

There were several slight shocks of earthquake felt yesterday (June 25) in Invernesshire, Scotland.

Olympia, Washington Territory: at 5.26 a. m. on the 27th a heavy shock of earthquake occurred at this place. It was accompanied by a rumbling noise. The vibration was from east to west.

The following reports have been received from the Signal Service observer at Unalashka, Alaska.

April 13th.—Quite a heavy shock of earthquake, lasting only a few seconds, occurred at 7.20 p. m.

April 30th.—A slight shock of earthquake occurred at 5.30 a. m.

FOREST AND PRAIRIE FIRES.

Manistique, Michigan, 1st: forest fires, twelve miles north-

west of station, began on May 28th, and burned over a tract three miles wide by twelve miles long.

Pike's Peak, Colorado, 5th: forest fires on the north side of the peak, below the timber-line.

Escanaba, Michigan, 8th: forest fires to the east and north of station.

Mount Washington, New Hampshire, 19th: the air was filled with smoke from forest fires.

Prescott, Arizona, 23d.

INSECTS.

Sunman, Ripley county, Indiana: locusts appeared in this vicinity on the 1st.

Vevay, Switzerland county, Indiana, 2d: "the number of seventeen-year locusts is increasing to an alarming extent."

Mount Carmel, Wabash county, Illinois, 6th: swarms of seventeen-year locusts made their appearance on this date; all trees were covered with them.

Guilford (near), Dearborn county, Indiana, 11th: seventeen-year locusts are causing damage to fruit trees.

Merced, Merced county, California, 5th: the orchards, vineyards, and gardens near the foot-hills of the Sierra Nevada and Coast mountain ranges have been completely destroyed by grasshoppers, and in some instances the bark has been eaten from the trees. Late wheat and barley have also suffered much damage.

Cañon City, Fremont county, Colorado, 6th: myriads of young grasshoppers have made their appearance on the south side of the Arkansas river opposite this place.

Little Rock, Arkansas, 6th: reports from northwestern Arkansas state that locusts and grasshoppers have appeared in large numbers.

Chattanooga, Tennessee, 9th: large numbers of locusts have made their appearance on the ridges north of this city, and all kinds of growth are covered with them.

Albion, Edwards county, Illinois: young locusts, in large numbers, began to appear on the 9th at Missouri Point, opposite this place.

Gainesville, Cooke county, Texas, 10th: farmers from the surrounding country report that a species of web-worm has made its appearance in the cotton fields and is causing much damage.

Kalamazoo, Kalamazoo county, Michigan, 12th: the Hessian fly is causing great damage in this county; it is estimated that the wheat crop will be short about 40,000 bushels from this cause.

Princetown, New Jersey, 12th: the seventeen-year locusts have made their appearance in vast numbers here and in central New Jersey, the ground and trees in some localities being completely covered with them.

Elkhart, Elkhart county, Indiana, 13th: seventeen-year locusts have appeared in large numbers in the northwestern part of this county.

Flint, Genesee county, Michigan, 13th: seventeen-year locusts have made their appearance in this vicinity.

New London, Connecticut: potato bugs were first reported in this vicinity on the 13th; the potato crop has been slightly damaged.

Cleburne, Johnson county, Texas, 19th: in some parts of this county the cotton worm has caused great damage.

Cumberland, Maryland: the seventeen-year locusts, which were very numerous during the month, disappeared about the 30th.

Greencastle, Indiana: during the month the seventeen-year locusts appeared in great numbers. The first were observed emerging from the ground May 25th and the last were seen June 15th. The first notes were heard May 30th, the greatest noise from June 10th to 13th, and at the close of the month but few were heard. The heavy rains of the 3d and 4th resulted in killing them in large numbers. Some kinds of trees were badly injured, but fruit trees sustained but slight damage.

METEORS.

Denton, Denton county, Texas: about midnight of the 5–6th a very brilliant meteor passed over this city, moving from southwest to northwest. It was, apparently, as large or larger than the moon and was visible about thirty seconds. During its flight it changed in color from blue to crimson, and finally to an intense white, making it nearly as light as day. About eight or ten minutes after the disappearance of the meteor a low, rumbling sound was heard.

Greenville, Hunt county, Texas: a meteor passed over this place during the night of the 5–6th; it was accompanied by a roaring sound, and caused considerable alarm.

Pilot Point, Denton county, Texas: at about midnight of the 5–6th; many persons in this vicinity were startled by the sudden appearance of a brilliant light. A few minutes later a loud, roaring sound was heard which caused buildings to shake.

The following are extracts from the "Galveston News" of June 6th:

McKINNEY, *June* 6.—Last night about midnight a remarkable meteor passed across the sky from northeast to southwest. The light was so bright that a pin could have been seen on the ground, as in daytime. As the light faded out a very loud explosion, followed by a deep, low, rumbling sound, lasting several seconds, took place. It was witnessed and heard by several hundred people in McKinney who had just returned home from Professor Raymond's school exhibition. Several report that while the meteor was passing through the air there was a hissing sound. In size it was reported as varying from the size of a plate to that of a flour barrel.

The light appeared to be of the order of a calcium light. It was seen and heard across the country.

SHERMAN, *June* 6.—A large meteor, moving in a southwesterly direction, passed over here last night. The whole city was illuminated during its passage, which was fully one-half a minute. A few minutes after its disappearance a loud explosion, similar to heavy artillery, was heard, accompanied with a shock, shaking dwellings and even rattling the glass in the court-house. This was succeeded by a rumbling, as of distant thunder. Different parties who claimed to have seen the celestial visitor estimate its apparent size from the size of a man's head to the size of a cart-wheel. It was also noticed at McKinney, with the same effect.

DALLAS, *June* 6.—A meteor passed over Dallas at 1 o'clock this morning illuminating the entire city with the splendor of day.

Huntsville, Walker county, Texas: a very brilliant meteor was observed on the 6th; it started from near the North star and fell slowly toward the northwestern horizon.

Chester, Olmstead county, Minnesota: a very brilliant meteor was observed in the northeast at 9 p. m. on the 8th.

West Union, Fayette county, Iowa: at 9 p. m. on the 9th a bright meteor was observed, moving in a northerly direction nearly parallel with the horizon.

Cahuenga, Los Angeles county, California: at 1 a. m. on the 14th a very brilliant meteor was observed in the north-northwest; it fell perpendicularly from an altitude of 30° to within 10° of the horizon, where it exploded, leaving a smoke-like trail, which remained visible about one minute.

Davenport, Iowa: a bright meteor was seen at 8.30 p. m. on the 25th; it started near the southern horizon, moved slowly northward, and disappeared when near the zenith, leaving a bright trail.

Meteors were also observed on the several dates, as follows:

Dover, New Jersey, 3d.
Greenborough, Alabama, 4th.
Lead Hill, Arkansas, 6th.
Bethel, Connecticut, 6th, 8th.
Santa Rosa, California, 7th.
Limona, Florida, 8th.
Prairie du Chien, Wisconsin, 8th.
Rowe, Massachusetts, 9th.
Allison, Kansas, 12th 16th, 17th, 19th, 28th.
Voluntown, Connecticut, 13th.
Webster, Dakota, 13th, 28th.
Stateburg, South Carolina, 14th.
Burlington, Iowa, 14th, 25th.
Somerset, Massachusetts, 15th.
Terre Haute, Indiana, 16th.
Montrose, Colorado, 20th.
Cleburne, Texas, 22d.

POLAR BANDS.

Polar bands were reported during the month by the following stations:

Montrose, Colorado, 21st.
Wabash, Indiana, 24th.
Guttenberg, Iowa, 10th, 11th, 22d.
Mountainville, New York, 1st, 23d.
Wauseon, Ohio, 2d, 10th.
Pittsburg, Pennsylvania, 3d.
El Paso, Texas, 9th 12th.
Rio Grande City, Texas, 6th, 25th.
Wytheville, Virginia, 10th, 23d, 26th.
Dale Enterprise, Virginia, 10th, 29th.
Bainbridge Island, Washington Territory, 3d.
Fort Canby, Washington Territory, 7th, 8th.
Prairie du Chien, Wisconsin, 26th.

SAND STORMS.

Fort Thomas, Arizona, 21st.
Wickenburg, Arizona, 4th.
Maricopa, Arizona, 24th.
Keeler, California, 10th.
Santa Fé, New Mexico, 5th.

WATER-SPOUTS.

The ship "Union," H. Fokken, commanding, on June 4th, in N. 41° 18′, W. 59° 31′, saw a large water-spout.

The observer at Key West, Florida, reports that at 12.50 p. m. on the 12th a large but imperfectly-formed water-spout was observed about four miles to the north-northwest of that station. It moved rapidly in a southwesterly direction for ten minutes and then broke. A second and smaller water-spout then appeared in the north-northwest; it followed the course of the one first observed for two or three minutes and then broke.

The s. s. "Grip Fast," Captain Burgess, on June 20th, in N. 36° 9′, W. 71° 33′, saw two water-spouts, one about two miles to the northwest of the vessel and the other about three miles to the southward.

ERRATUM.

In the REVIEW for February, 1885, page 46, under "cautionary signals," in the second line, the number of cautionary signals justified, should read one hundred and fifty instead of one hundred and forty-four; the percentage, 93.75, as published, is correct.

NOTES AND EXTRACTS.

The following extract is from the June, 1885, report of the "Alabama Weather Service," under direction of Prof. P. H. Mell, jr., Auburn:

The month of June has been moderately cool for the season. The thermometer at Calera registered as low as 59°, on the 29th, and 65°, at Mountain View, on the 18th and 30th. This cool wave retarded the growth of the cotton plant to a limited degree, but the injury was slight, and from all quarters of the state good reports are given concerning the crop outlook.

The precipitation was below the normal, but the rainfall was quite evenly distributed throughout the month, and vegetation has not suffered from the lack of moisture. Heavy dews were quite frequent, and the deficiency in rainfall was thus counterbalanced.

Summary.

Mean temperature, 78°.5; highest temperature, 109°, at Livingston, on the 6th; lowest temperature, 54°, at Gadsden, on the 1st; range of temperature, 55°; greatest monthly range of temperature, 43°, at Livingston; least monthly range of temperature, 20°, at La Fayette; mean daily range, 16°.3; greatest daily range of temperature, 44°, at Calera, on the 3d; least daily range of temperature, 2°, at Livingston, on the 26th, and Union Springs, on the 9th.

Mean depth of rainfall, 3.88 inches; mean daily rainfall, 0.126 inch; greatest depth of monthly rainfall, 8.00 inches, at Mount View; least depth of monthly rainfall, 1.23 inches, at Selma; greatest daily rainfall, average for state, 0.48 of an inch, on the 12th; Greatest daily local rainfall, 4.90 inches, at Mount View, on the 12th; days of general rainfall, 8th, 9th, 12th, 16th, 25th; average number of days on which rain fell, 9; average number of cloudy days, 10.3; average number of fair days, 13.9; average number of clear days, 5.8; warmest days, 5th, 6th, 15th; coldest day, 30th.

Prevailing direction of wind, southwest.

Mobile reports that the greatest velocity of wind was 32 miles per hour, from the northeast; Chattanooga, 22 miles, from the northwest; Montgomery, 23 miles, from the northwest; Tuscaloosa, 20 miles, from the southeast.

Thunder-storms were general on the 9th, 13th, 19th, 22d, 24th, 27th, 28th.

The following is an extract from the June, 1885, report of the "Minnesota Weather Service," under direction of Prof. W. W. Payne, of Carleton College, Northfield:

The temperature for June in Minnesota has averaged slightly below the mean; the difference amounting to —0°.3, at Duluth, —2°.0, at Moorhead, —0°.5, at Saint Paul and —°.8, at LaCrosse. Three well-marked cool terms occurred. The first of these cool waves began on the 7th, when there was a sudden and great fall in temperature at all stations, amounting in most cases to from 30° to 50°. On the morning of the 8th and 9th frosts occurred throughout the state, in some sections to the injury of vegetation, while in others not sufficiently heavy to do any harm. At Park Rapids a minimum temperature of 27°.9 was noted on the 8th, cutting down all tender vegetation, which subsequently recovered. At Saint Paul the temperature fell to 36°.0, the lowest, by 3°.0, for June on record. Cool weather prevailed on the 15th and 16th, and the 20th and 21st. The warmest days were the 1st, 11th, 12th, 13th, 14th, 19th, 20th, 26th and 27th. The maximum temperatures of the month were generally observed on the 18th, 19th and 20th; the lowest minimum being 84.1°, on the 18th, at Saint Vincent and highest 94°.0, on the 20th, at Sherburne, Martin county.

The rainfall for June was in excess of the normal at some stations, while others report a marked deficiency. One station, Milbank, reports less than 2 inches (1.56), and three, Mankato, Park Rapids and Moorhead, over 7 inches, 7.40, 7.50 and 7.92, respectively. The region of greatest rainfall was in the northwestern portion of the state, in the vicinity of Park Rapids, Moorhead, Barnesville and Fergus Falls and the central eastern part of the state, at Waseca and Mankato. The greatest deficiency was, as in May, in the central western portion: Bird Island, 2.03, and Milbank, 1.56 inches. Days of greatest rainfall were the 2d, 3d, 6th, 11th, 12th, 13th, 14th, 18th, 19th, 20th and 25th; rains of one inch and over: Moorhead, 1.26, on the 11th, and 2.60, on the 14th; Saint Paul, 1.17 on the 15th; Duluth, 1.90 on the 12th; Redwing, 2.45, on the 13th; Park Rapids, 11th, 1.41; 12th, 1.60; 13th, 1.00, and 19th, 1.35; La Crosse, 13th, 1.03; Mankato, 2d, 4.50 and 13th, 1.27; Albert Lea, 12th, 1.63; Dodge Centre, 2d, 1.30.

Thunder and hail storms were frequent and destructive during the month. On the 2d, 3d, 6th and 7th great damage was caused in the southern part of the state by hail. At Spring Valley much damage was done to crops and buildings by the severe hail and wind storm of the 7th, which had many of the features of a tornado.

The following is an extract from the June, 1885, bulletin of the "New England Meteorological Society," under direction of Prof. Winslow Upton, Providence, R. I.:

The following discussion of the meteorological conditions for the month is based upon reports from one hundred and thirteen observers, and upon the current publications of the United States Signal Service:

General conditions.—The month was characterized by fair weather, with temperatures a little below the average. It was also a dry month, and in some sections the lack of rain began to have an appreciable effect on vegetation. The abundant rains of the closing days of the month which occurred in some localities, though not in all, somewhat relieved the drought. Numerous thunder-storms and a few high winds were reported.

Precipitation.—A comparison with the records of former years shows a striking irregularity in the distribution of the rain. This irregularity is due to the differences in the distribution of the rain in the storms of the 5th and 29th–30th, for, while rain was general in both of these storms, there was great discordance in the amounts which fell even at places in the same locality, especially in the latter storm. Thus, at Fitchburg, Massachusetts, the amount reported was 0.22 inch., and at Petersham 0.25 inch., but at Lawrence and Lowell, Massachusetts, the amounts were 1.77 and 2.24 inches, respectively, while New Bedford received 3.28, and Cotuit 3.55 inches. In New Hampshire and Vermont similar peculiarities were noted; thus, in New Hampshire: Hanover, 0.56, and Concord, 2.77 inches; in Vermont, Dorset, 0.50, and Lunenburgh, 2.03 inches. In Maine the amounts were all large, and in some cases an enormous excess is reported, as Eastport, 2.35, Sebago Lake, 2.97, Gardiner, 3.82 inches. Newspaper reports give the extraordinary amount of 7.50 inches at Augusta, and our observer at Mayfield reports 8.00 inches. There can be no question but that the distribution in this storm was of unusual irregularity, and that very excessive amounts fell in certain localities. The reports show a wide divergence in the comparison of the records with those of past years, which is due to the above cause. The amount of rain at Mount Washington is large, but has been exceeded in several years, the greatest amount for June, 18.46 inches, having been noted in 1872. Snow fell on three days at Mount Washington; on the 24th, Mount Lafayette, New Hampshire, was covered with snow, and on the 9th a slight amount fell at Saint John, New Brunswick. Hail was noted at Albany, New York, on the 9th.

Temperature.—The temperature record presents no unusual characteristics. The monthly average is somewhat below that of former years, with but few exceptions. No unusually high temperatures were noted, though at many stations the temperature was above 90° on one or two days. Cool weather was frequent in the early days of the month, and light frosts were numerous on the 6th, 9th, and 10th. No serious damage to crops was reported.

Pressure.—The fluctuation of the pressure was about as usual, but the monthly average is low, especially in Maine. Five depressions moved near, or over, the district, two passing directly over Massachusetts. All of these approached from the lake region, moving easterly. Their dates were 1st, 5th,

8th, 22d, 29th–30th; of these, the second and fifth were those which passed centrally over the district, the others moving down the Saint Lawrence valley. It will be noticed that the irregular distribution of rain commented on above was in connection with these two storms. The fourth depression presents the anomaly of a depression of considerable depth (the pressure at Montreal on the morning of the 22d having been but 29.36 inches), but was attended by but little precipitation. With the exception of Mount Washington, at which 1.62 inches fell, but little rain was noted at any station.

The following summary for June, 1885, is compiled from the advance report of the "Ohio Meteorological Bureau," under direction of Prof. T. C. Mendenhall:

Atmospheric pressure.—Mean barometer (determined from observations at nineteen stations), 30.01 inches; station reporting highest monthly mean, Wapakoneta, 30.15 inches; station reporting lowest monthly mean, Portsmouth, 29.82 inches; station reporting highest observed reading, Marietta, 30.30 inches, on the 19th; station reporting lowest observed reading, Hiram, 29.45 inches, on the 5th; station reporting greatest monthly range, Cleveland, 0.68 inch; station reporting least monthly range, Ironton, 0.52 inch.

Temperature.—Mean for the state (determined from observations at twenty-eight stations), 67°.2; station reporting highest monthly mean, Pomeroy, 73°.3; station reporting lowest monthly mean, Jefferson, 62°.6; station reporting maximum temperature, Sandusky, 96° on the 7th; station reporting minimum temperature, Junction, 36°, on the 23d; monthly range of temperature for the state 60°; station reporting largest monthly range, Oberlin, 53°.5; station reporting least monthly range, Cincinnati, 31°.8.

Precipitation.—Average for the state (determined from observations at twenty-six stations), 4.41 inches; station reporting largest monthly amount, Hiram, 7.66 inches; station reporting least monthly amount, Junction, 1.52 inches.

The following is an extract from the "Illinois Weather Review" for June, 1885, prepared under direction of Mr. C. F. Mills:

The mean temperature of June, 1885, as indicated by the reports of observers residing in all sections of the state, was higher than the average temperature of June at six stations, and lower at sixteen stations; eleven new stations are not included.

The mean temperature of June the past five years has been as follows, viz.: 1881, 70°.53; 1882, 71°.12; 1883, 69°.40; 1884, 71°.08; 1885, 71°.03.

The highest temperature noted in June for a term of years has been as follows: 1881, 99°.00; 1882, 98°.00; 1883, 95°.00; 1884, 98°.00; 1885, 96°.00; and the lowest temperature for the same month has been as follows: 1881, 39°.00; 1882, 39°.00; 1883, 40°.00; 1884, 45°.00; 1885, 36°.00.

The highest temperature reported in June, 1885, was 96°.00 on the 3d, at Centralia. The lowest, 36°.00, on the 9th, at Wilton Centre, Will county. The highest temperature during the month at a majority of the stations was on the 7th and 26th; the lowest on the 8th and 9th.

The most marked changes in the temperature of the northern division of the state during the month was on the 8th of June, when the lowest daily mean of 50°.00 was recorded for the northern stations. The mean temperature the previous day was 75°.00, making a change of 25°.00 in twenty-four hours. There was another marked change in the temperature in the northern division on the 21st, when the daily mean was 8°.00 below that of the preceding day. On the following day (22d) there was another fall in the temperature of 8°.00, making the reduction 16°.00 in two days.

The precipitation for June, 1885, exceeds the June average for a term of years as noted at the following stations: At Marengo, McHenry county, the June, 1885, precipitation was 1.69 inches more than the average rainfall for a term of years; Chicago, 0.95 inch; Aurora, Kane county, 1.47 inches; Peoria, Peoria county, 0.02 inch; Mattoon, Coles county, 1.38 inches; Pana, Christian county, 5.12 inches; Bunker Hill, Macoupin county, 2.13 inches; Collinsville, Madison county, 1.94 inches; Saint Louis, Missouri, 2.69 inches; Anna, Union county, 0.72 inch; Golconda, Pope county, 3.08 inches; Cairo, Alexander county, 0.10 inch.

The rainfall for June is less than the average for the month at the following stations: At Sycamore, DeKalb county, the June, 1885, precipitation was 0.30 inch less than the average precipitation for June; Prairieville, Lee county, 0.41 inch less; Davenport, Iowa, 2.80 inches; Keokuk, Iowa, 1.38 inches; Springfield, Sangamon county, 2.31 inches; Griggsville, Pike county, 1.98 inches; Palestine, Crawford county, 0.81 inch; Greenville, Bond county, 1.54 inches; McLeansboro, 0.96 inch; Sanwick, Perry county, 0.31 inch.

Frosts are reported to have occurred during the month of June at the stations named, on the following dates: Champaign county, Philo, 9th; Christian county, Pana, 9th; Coles county, Mattoon, 9th; Douglas county, Hugo, 8th; Iroquois county, Watseka, 9th; Knox county, Onedia, 9th; McHenry county, Marengo, 9th; Piatt county, Atwood, 9th; Will county, Wilton Centre, 9th.

The following is the June bulletin of the "Iowa Weather Service," under direction of Dr. Gustavus Hinrichs, Iowa City:

June, 1885, was nearly normal, with excess of rainfall during the first half.

The mean temperature of the air was only half a degree below normal, the first decade being about one and a half degrees above, the last decade three degrees below, normal.

The first half of the month was very rainy, and the amount of rainfall largely in excess of normal, thus hindering the working of the corn fields. During the last half of the month fine and bright days were numerous, but the temperature was rather low.

The principal storms occurred during the first, warm and rainy, half of the month. The thunder squall of the 7th, in southern and eastern Iowa, was followed by remarkably cold weather, a slight but harmless frost being noted on the morning of the 9th in northwestern Iowa. The thunder-storm of the 12th was quite extended throughout the state, with considerable rainfall. But the most noted storm of the month was the squall which, from late Sunday evening until about three o'clock Monday morning, June 15th, came down from the northwest to about the line of the Rock Island road, without doing much damage to fairly good structures, except in Ida and Cerro Gordo counties, where it was preceded by minor tornadoes, the very narrow track of which were marked by the usual destructive effects for the short distances in which the tornadoes reached down to the earth.

The extended storm was truly a squall, which well constructed buildings ought to resist with but slight injury, and against the effects of which properly planted trees will greatly protect, by retarding the motion of the air in the lower stratum in which our dwellings stand. The tornadoes which occurred in two points of the state were very insignificant indeed.

During the latter half of the month, the generally prevailing very fine weather was interrupted by two very moderate squalls on Saturday the 27th.

The following meteorological summary and accompanying remarks are from the June, 1885, report of the "Indiana Weather Service," under direction of Prof. H. A. Huston, of Purdue University, Lafayette:

Districts.	Temperature.			Precipitation.
	Highest.	Lowest.	Monthly mean.	
	°	°	°	
Northern counties	94	39	68.33	4.90
Central counties	90.1	36	68.45	5.09
Southern counties	94	50	71.27	3.40
State	94	36	69.35	4.46

The mean temperature of the state for June, 69°.35, is 2°.74 below that for June of last year, 3°.26 below the mean of fourteen years at Indianapolis, 0°.58 below the mean of nine years at Wabash, 1.35 above the mean of twenty-six years at Logansport, 1°.15 below the mean of thirty-one years at Spiceland, 4°.75 below the mean of twenty-one years at Vevay, 2°.08 beiow the mean of four years at Blue Lick, 4°.32 below the mean of four years at Worthington, 0°.36 below the mean of six years at this station, and about 3° below the normal.

The mean precipitation for the state, 4.46 inches, is 1.10 inches above that of last year; 0.87 below the mean of fourteen years at Indianapolis; 0.18 below the mean of nine years at Wabash; 0.65 above the mean of twenty-six years at Logansport; 0.18 above the mean of thirty-one years at Spiceland; 0.41 below the mean of twenty-one years at Vevay; 0.16 above the mean of four years at Worthington; and 1.71 below the mean of six years at this station.

The barometer is above the normal for June.

The frost of the 9th did some damage to growing plants in the northern counties.

The thunder-storm of the 27th was very severe at this station. The wind reached a velocity of forty-five miles per hour at 4 p. m.

The following meteorological summary and accompanying remarks are from the June, 1885, report of the "Indiana Volunteer Weather Service," under direction of Prof. W. H. Ragan, of De Pauw University, Greencastle:

Districts.	Temperature.			Precipitation.
	Highest	Lowest.	Monthly mean.	
	°	°	°	
Northern counties	94	36	68.5	4.48
Central counties	92	36	68.1	5.09
Southern counties	97	46	71.8	3.79
State	97	36	69.5	4.75

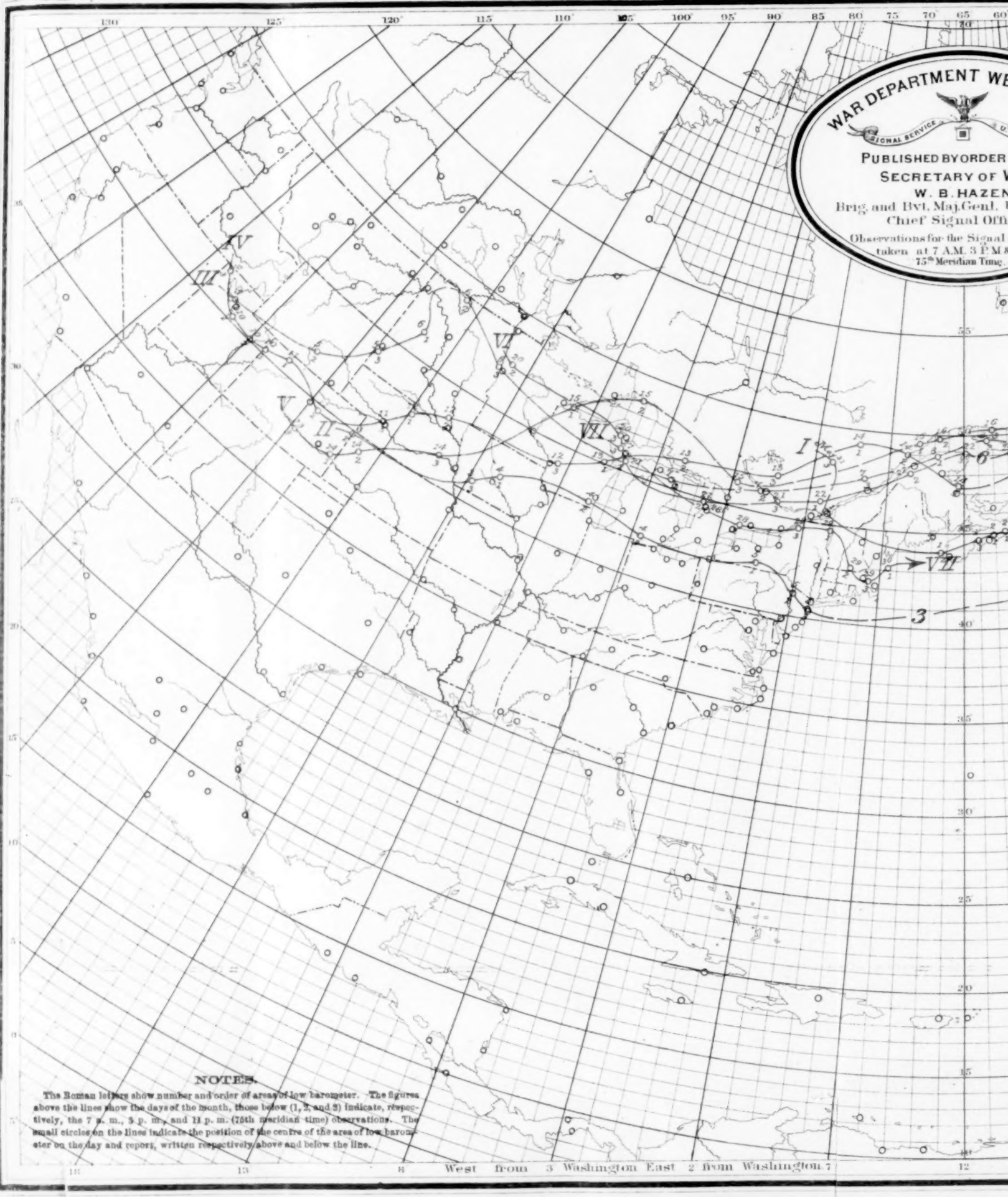
The temperature averaged a little low, being 0°.5 below the average of nine years at Wabash; 2°.7 below twenty-nine years, Logansport; 1°.6 below thirty-one years, Spiceland; 3°.7 below fifteen years, Indianapolis; 1°.8 below five years, Mauzy; 2°.0 below twenty-one years, Vevay. The average for the state was 0°.7 lower than in 1883, and 2°.9 lower than in 1884. The highest occurred, at most stations, on the 7th, in connection with a low barometer central, that morning, north of the lakes, and a high central off the south Atlantic coast, and the lowest on the 9th in connection with a high central in Iowa and a low in the Gulf of Saint Lawrence.

The temperature averaged 6°.6 lower at our most northerly than at the most southerly station.

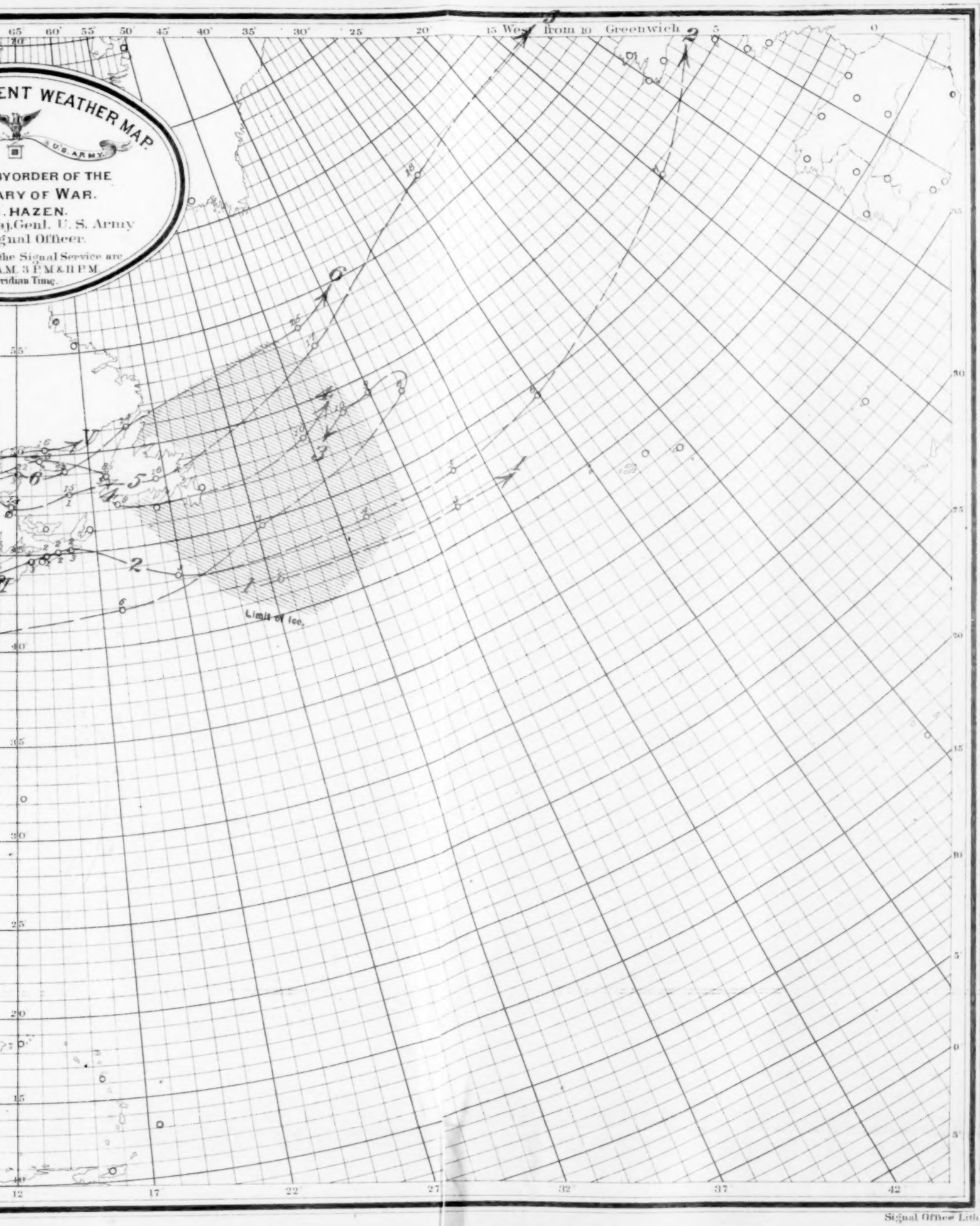
The precipitation was 1.23 inches above the average of nine years at Wabash; 1.32 above at Logansport; 0.64 below at Spiceland; 0.27 above at Indianapolis; 1.01 below at Vevay, and the average for the state 0.61 lower than 1883, and 1.05 higher than 1884. The rainfall was unevenly distributed through the month and over the state.

Form 106 G 1884.

Chart I. Tracks of Low-Baro


WAR DEPARTMENT WE
SIGNAL SERVICE
PUBLISHED BY ORDER
SECRETARY OF W
W. B. HAZEN
Brig. and Bvt. Maj. Genl. U
Chief Signal Offi
Observations for the Signal
taken at 7 A.M. 3 P.M &
75th Meridian Time.
I
II
III
IV
V
VI
VII
3
6
NOTES.
The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month, those below (1, 2, and 3) indicate, respectively, the 7 a. m., 3 p. m., and 11 p. m. (75th meridian time) observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and repors, written respectively above and below the line.
West from 3 Washington East 2 from Washington 7

w-Barometer Areas, June, 1885.

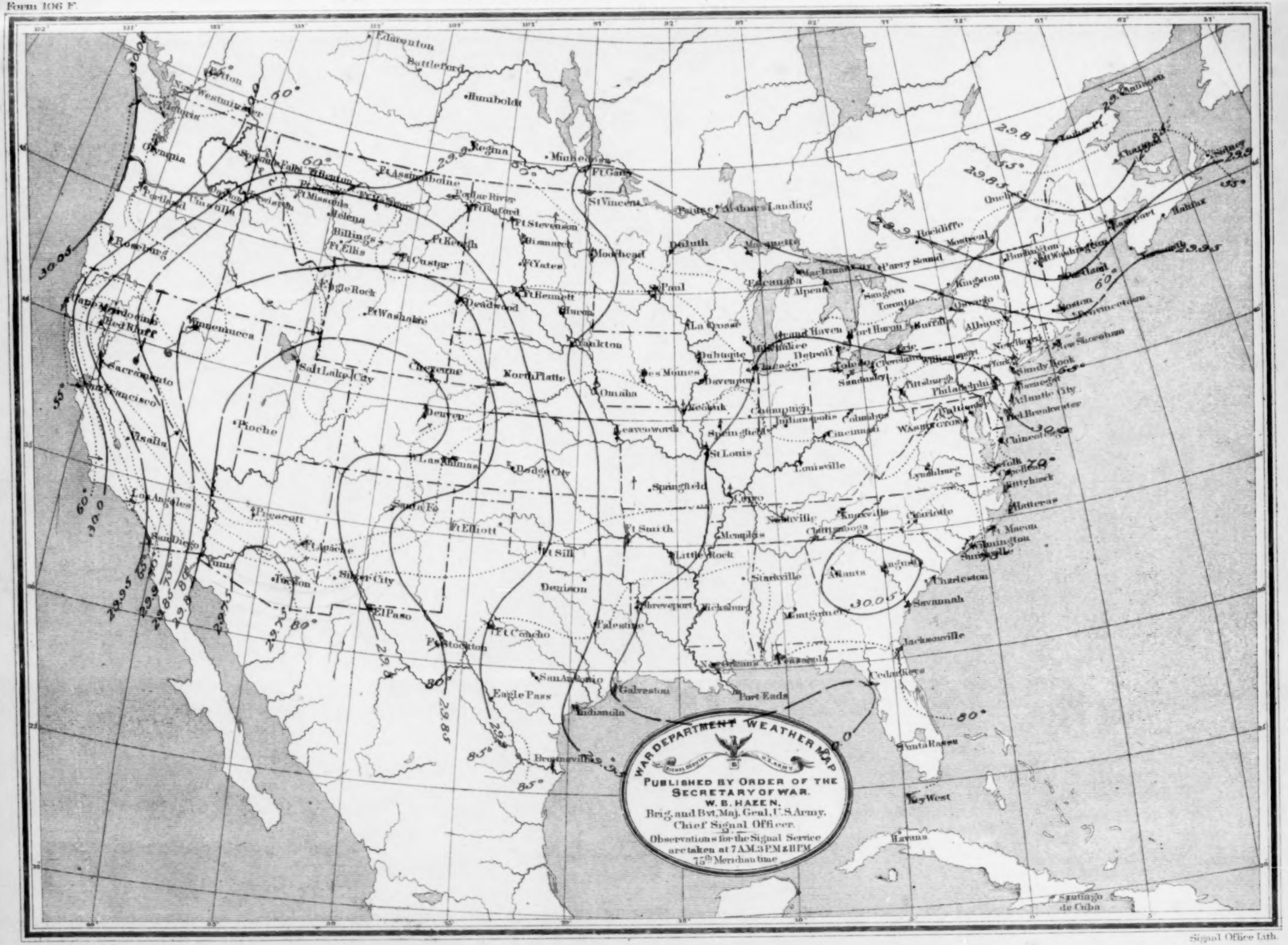


Signal Office Lith.

Chart II. Isobars, Isotherms, and Winds. June, 1885.

Form 106 F.

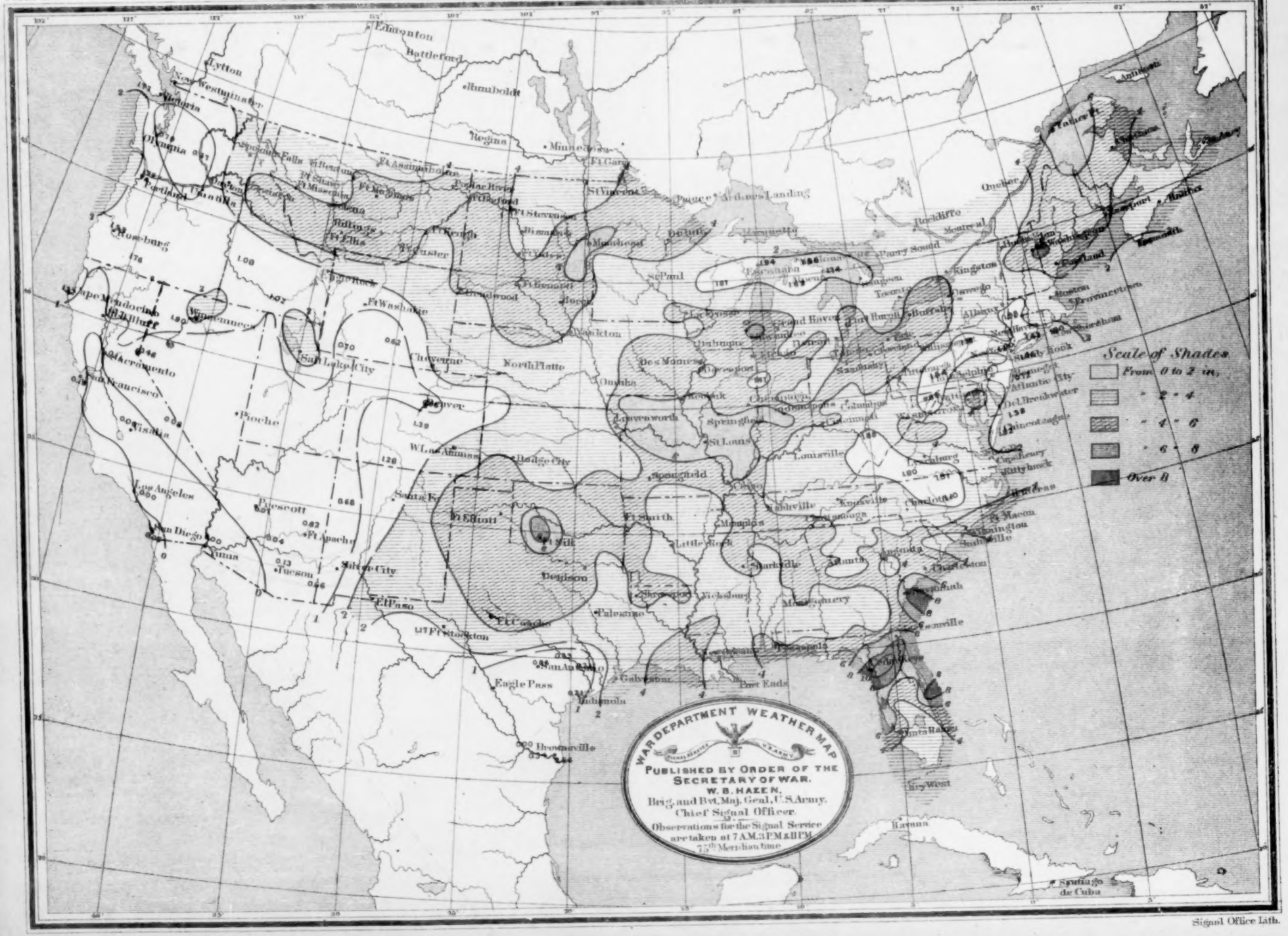
Chart II. Isobars, Isotherms, and Winds. June, 1885.


WAR DEPARTMENT WEATHER MAP
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
W. B. HAZEN,
Brig. and Bvt. Maj. Genl. U.S. Army,
Chief Signal Officer.
Observations for the Signal Service are taken at 7 A.M. 3 P.M. & 11 P.M.
75th Meridian time.

Signal Office Lith.

Form 106 F.

Chart III. Precipitation, June, 1885

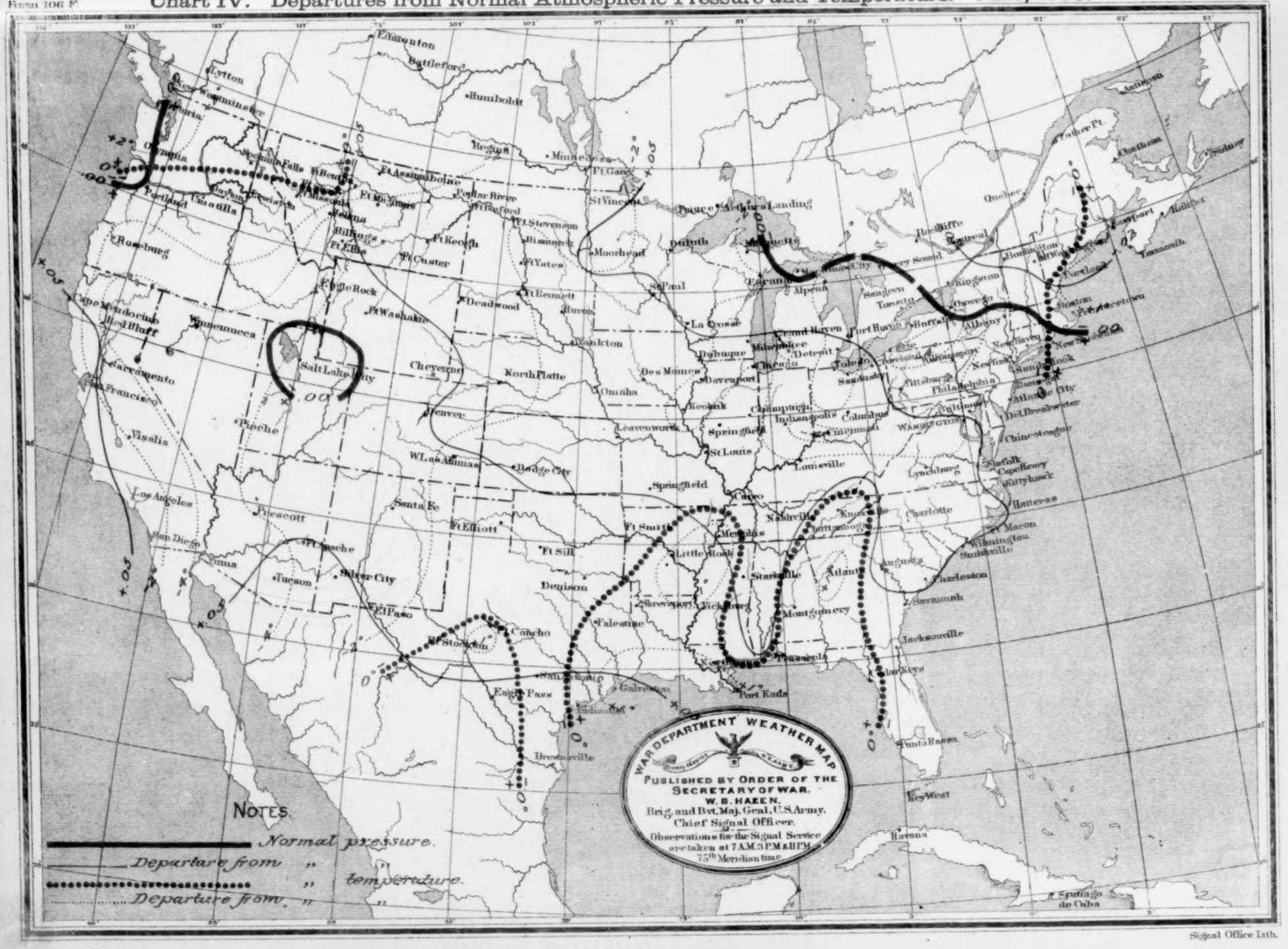


Signal Office Lith.

Chart IV.—Departures from Normal Atmospheric Pressure and Temperature. June, 1885.

Form 106 F

Chart IV. Departures from Normal Atmospheric Pressure and Temperature. June, 1885.


WAR DEPARTMENT WEATHER MAP
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
W. B. HAZEN,
Brig. and Bvt. Maj. Genl. U.S. Army,
Chief Signal Officer.
Observations for the Signal Service are taken at 7 A.M. 3 P.M. & 11 P.M. 75th Meridian time.
NOTES.
Normal pressure.
Departure from " "
temperature.
Departure from " "

Signal Office Lith.

Voluntary observers of the Signal Service, on land, from whom meteorological reports were received in time to be used in the preparation of the Monthly Weather Review for June, 1885.

Observer and place of observation.

Anderson, Dr. W. W., Stateburg, S. C.
Altaffer, J. M., Independence, Kans.
Adams, Dr. O. H., Vineland, N. J.
Abbott, Dr. E. K., Salinas, Cal.
Alexander, S., Birmingham, Mich.
Arents, Hiram, Oroville, Cal.
Archilhon, R., Clear Lake, Ark.
Blake, J. H., Christmas Prairie, Cal.
Beans, Thos. J., Moorestown, N. J.
Ballou, Dr. N. E., Sandwick, Ill.
Boynton, John F., Syracuse, N. Y.
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Angel Island, Cal.
Assinaboine, Fort, Mont.
A. Lincoln, Fort, Dak.
Benicia Barracks, Cal.
Brady, Fort, Mich.
Bridger, Fort, Wyo.
Brown, Fort, Tex.
Barrancas, Fort, Fla.
Concho, Fort, Tex.
Columbus, Fort, N. Y.
David's Island, N. Y. H.
Ellis, Fort, Mont.
Fred Steele, Fort, Wyo.
Gaston, Fort, Cal.
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Klamath, Fort, Oreg.
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Monroe, Fort, Va.
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Union, Fort, N. Mex.
Wingate, Fort, N. Mex.
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State weather services from which meteorological reports were received in time to be used in the preparation of the Monthly Weather Review for June, 1885.

Alabama State Weather Service, under direction of Prof. P. H. Mell, Jr., Auburn, Alabama.
Nebraska State Weather Service, under direction of Prof. Goodwin D. Swezey, Crete, Nebraska.
Illinois State Weather Service, under direction of Mr. C. F. Mills, Springfield, Illinois.
Indiana Volunteer Weather Service, under direction of Prof. W. H. Ragan, Greencastle, Indiana.
Indiana State Weather Service, under direction of Prof. H. A. Huston, La Fayette, Indiana.
Ohio State Weather Service, under direction of Prof. T. C. Mendenhall, Columbus, Ohio.
Minnesota State Weather Service, under direction of Prof. W. W. Payne, Northfield, Minnesota.
Iowa State Weather Service, under direction of Prof. Gustavus Hinrichs, Iowa City, Iowa.
New England Meteorological Society: Prof. Winslow Upton, of Providence, director; Mr. W. M. Davis, of Cambridge, secretary.
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